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A QUARTERLY JOURNAL DEVOTED EXCLUSIVELY TO PROBLEMS OF THE

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THE
LARYNGOSCOPE.

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ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding that they are contributed exclusively to THE LARYNGOSCOPE.)

AN X-RAY STUDY OF INTUBATION.

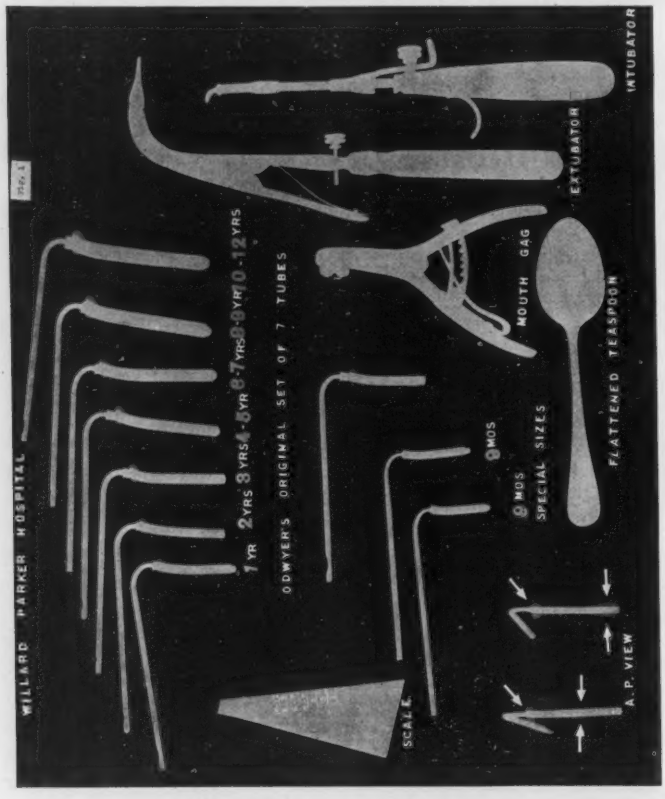
DR. E. GIDDINGS and DR. D. E. EHRLICH, New York City.

The subject of Visualization of the procedure of intubation was dealt with by Shurley in 1905 in a series of illustrations made on the dissected cadaver. In the 43rd Annual Report of the American Laryngological Society, there appears a resume of Leffert's graphic illustration of intubation. In looking up the literature, we were unable to find any reference pertaining to the X-ray study of intubation. We then consulted Dr. L. T. Lewald, Attending Roentgenologist at the Willard Parker Hospital, who was not familiar with any previous work on the subject, so we are attempting to present graphically the various steps and some of the missteps in this procedure.

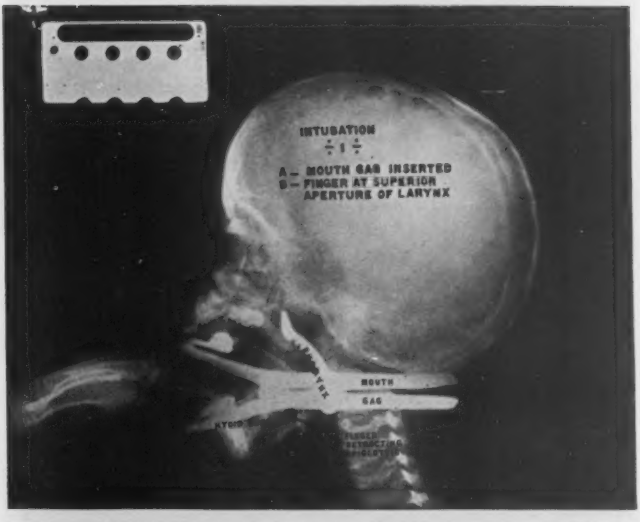
It is not our intention to dwell on the indications for, or the clinical aspects of intubation, but merely to visualize, by use of the Roentgen Ray, what has been heretofore left either to the sense of touch or the imagination; also to set forth some of the difficulties encountered. Intubation, like any other skilled procedure, requires practice. One must have a tactile knowledge of, and be familiar with, the landmarks about the superior opening of the larynx, and be able to insert the tube quickly, but not hastily. Without hurrying, a patient can be intubated and extubated within ten seconds. Owing to the fact that comparatively few cases require laryngeal interference, not many practitioners are afforded the opportunity of intubating. Besides, when in the opinion of the doctor a patient

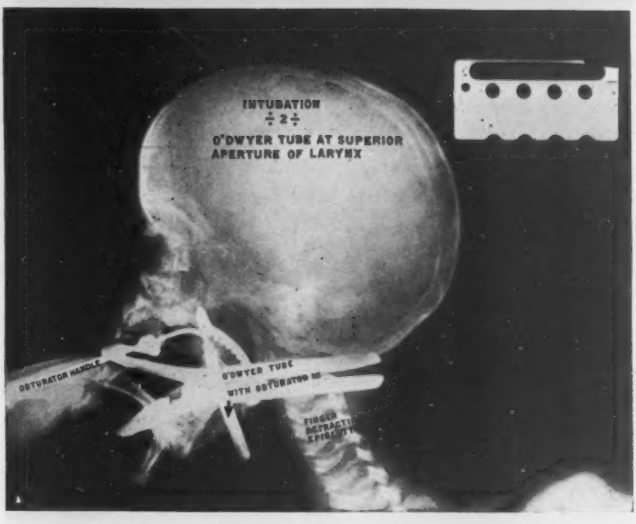
*Accepted June 16, 1922 for publication in The Laryngoscope.

requires intubation and knowing that the after care cannot be properly carried out in the average home, and in addition the possible complications would require his constant attendance, he prefers sending the patient to a hospital, if a hospital of that character is available. In New York City, the hospital service is so arranged that an ambulance, with a doctor and nurse trained in intubation,



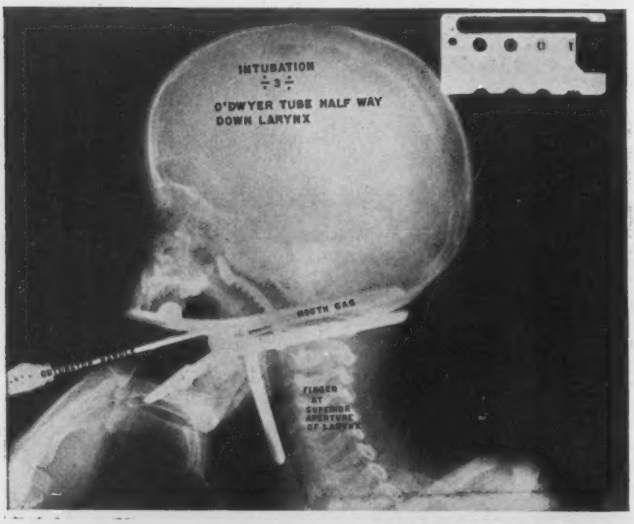
can be obtained by telephone at any time; and with few exceptions any point in the city can be reached in forty minutes or less. In the densely populated section in the vicinity of the Willard Parker Hospital the parents have been educated to the fact so that, when a child has any difficulty in breathing, irrespective of the cause, they hurry to the hospital without even consulting their physician. How-

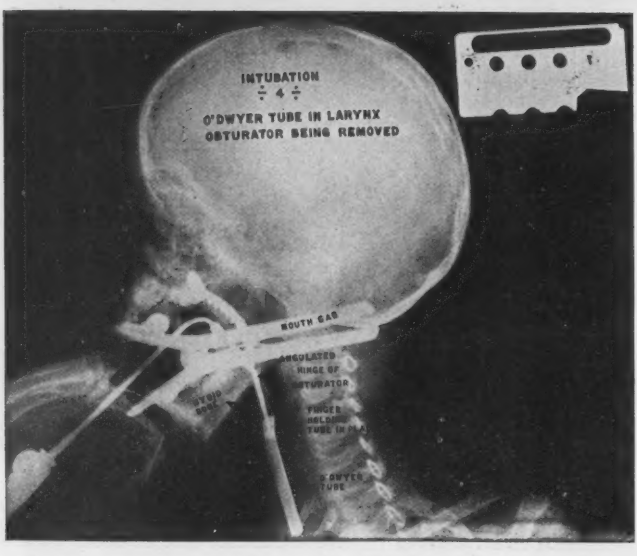




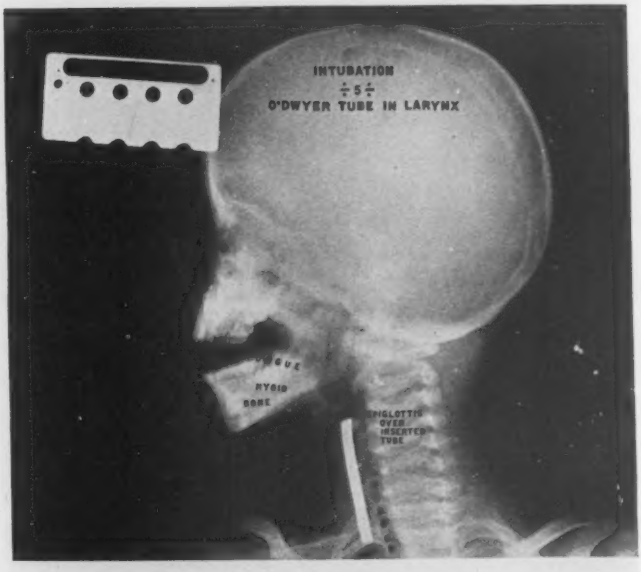
ever, should circumstances require immediate interference, what we are about to present may be of interest to any of you.

The Tube Set: (Fig. 1) The Intubation Set as originally devised by O'Dwyer is still used, with one or two slight modifications, which will be described later. The set consists of seven grad-





uated tubes, namely: 1, 2, 3, 4-5, 6-7, 8-9, 10-12—the numbers indicating the various ages, with an obturator to fit each tube. The obturator fits into a handle or introducer, with a spring arrangement to push the tube off the obturator. As the prongs at the end of the


INTUBATION
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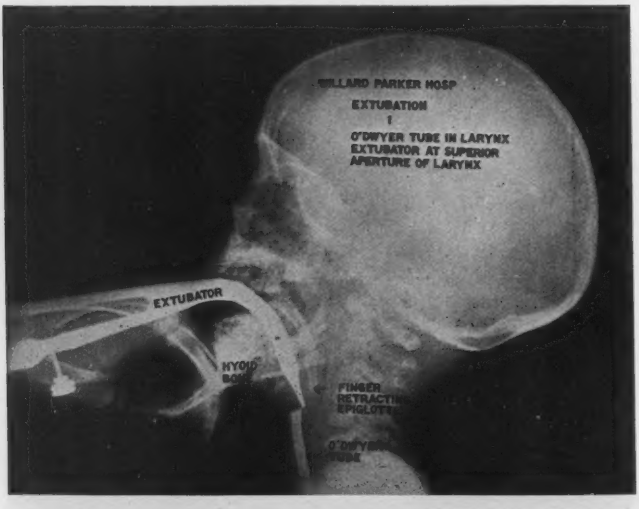
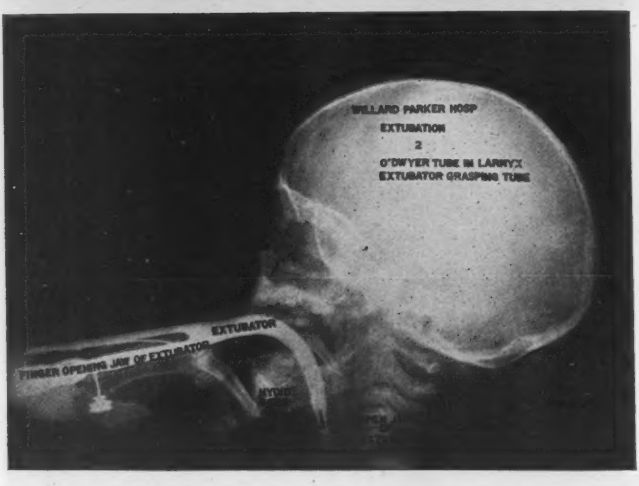
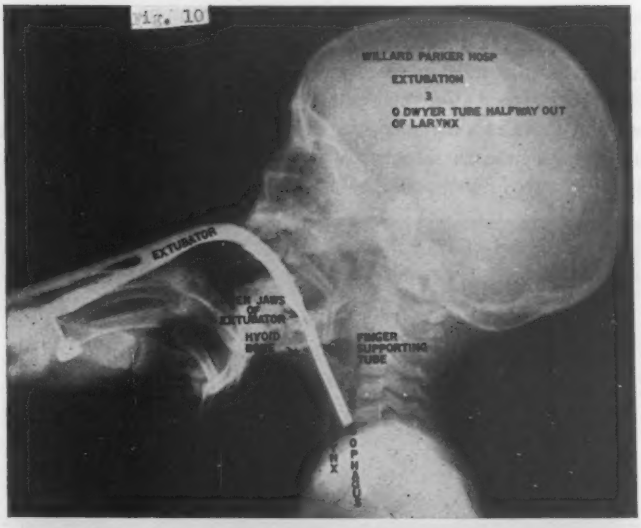
O'DWYER TUBE IN LARYNX
TONGUE
HYOID BONE
EPIGLOTTIS OVER INSERTED TUBE

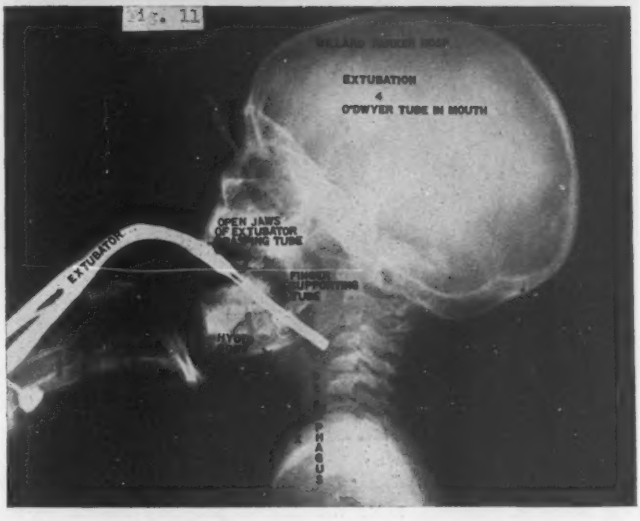
WILLARD PARKER HOSPITAL
COMMON MISSTEP IN EXTUBATION





spring become easily bent and retard rather than accelerate the pushing off of the tube, we have found it better to remove the spring and release the tube from the obturator by means of the finger. There is also a mouth-gag, an extubator, and a small scale for measuring the size of the tube. Owing to the fact that the patient's jaws are usually clenched very tightly, we have found that an ordinary teaspoon, flattened, is a quick and efficacious manner of open-

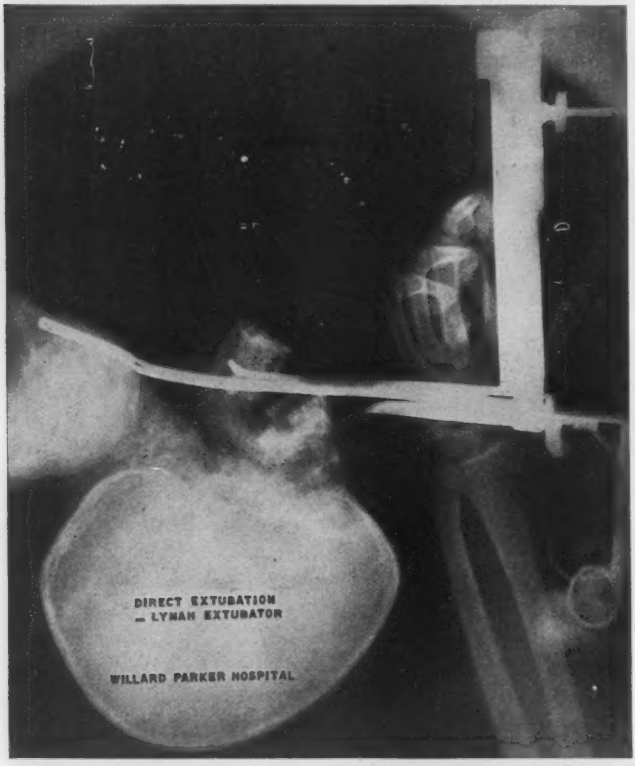




ing the jaws without doing any damage to the teeth. For the children under one year, there has been added, a 6 and 9 months tube and Lynah has devised dilating and non-cough up tubes.

The Tube: The tube consists of a cylindrical metallic core, outside of which is a hard rubber covering so molded that a swell at

its mid-portion accommodates the laryngeal configuration. At the upper part of the tube, on its posterior aspect, there is a flange which holds the tube in place and prevents it from being pushed down the larynx. On the right side of the tube with the flange posterior, there is a foramen, through which passes a waxed string. This string acts as a safeguard to remove the tube if it accidently finds its way into the esophagus. The reason for waxing the

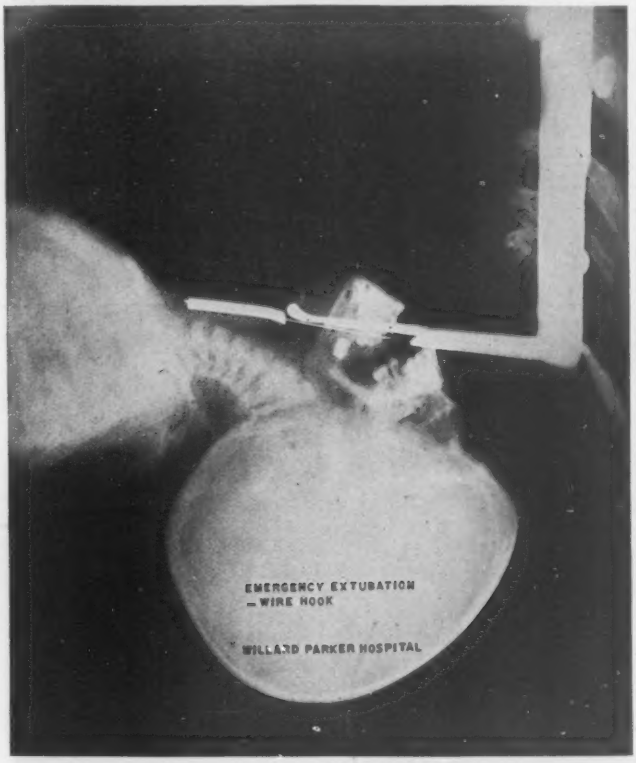


string is to lessen the possibility of its becoming twisted when the string is to be removed, after the tube is properly placed.

Non-Cough Up Tubes. If, for any reason, the patient is unable to retain a tube; that is, continues to cough it up (auto-extubation), a non-cough up tube has been devised by Lynah (Fig. 1, A. P. View). It is made in the various sizes corresponding to the ordinary tubes, and has a swell on the lower end. This dilated portion

holds the tube more firmly in the larynx and also relieves the pressure in the laryngeal ventricular folds.

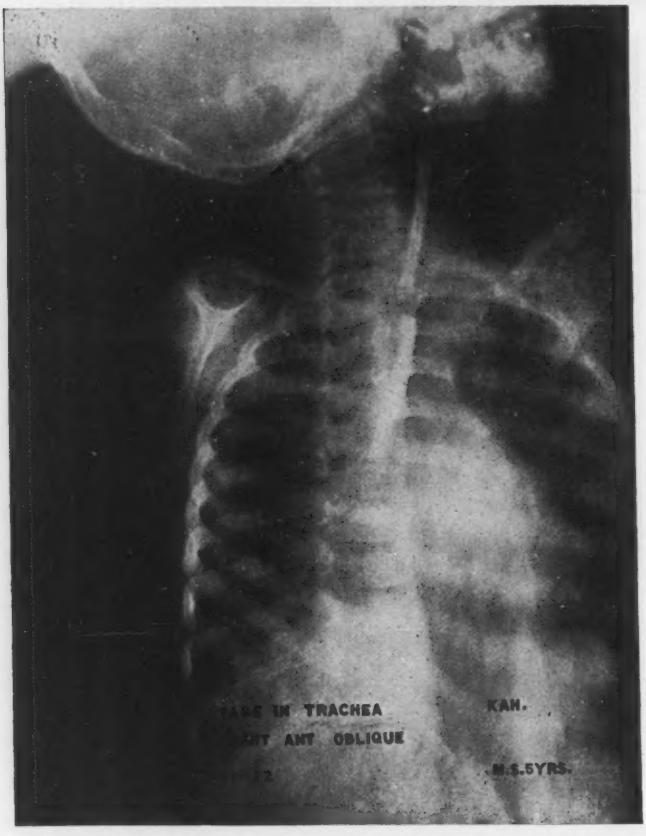
All Metal Tubes. Many metals have been used in tubes as a substitute for the rubber covered ones, but have, to a great extent, been discarded. At one time they were used in cough-up cases on account of their weight, but our experience has shown it is not the weight, but more the conformation that retains the tube. Mc-



Collum of Boston, uses gold tubes but thinks the hard rubber tube best when the tube must be retained for any length of time.

Anatomy. In intubation it is of prime importance to recall briefly the anatomy of the larynx, especially that of its superior aperature. The larynx is situated in the median line, the wedged-shaped thyroid cartilage forming the anterior, lateral and upper bounderies. The cricoid cartilage circumscribes its inferior portion, and it is in

front of the esophagus into the lumen of which the posterior and lateral walls of the larynx project. The hyoid bone (body and lateral corcua) can be seen on a lateral roentgenogram just beneath the angle of the mandible. Just behind and often below the hyoid bone is the epiglottis, which, on palpating with the finger in the throat, is felt in front of the superior aperture. Laterally on either

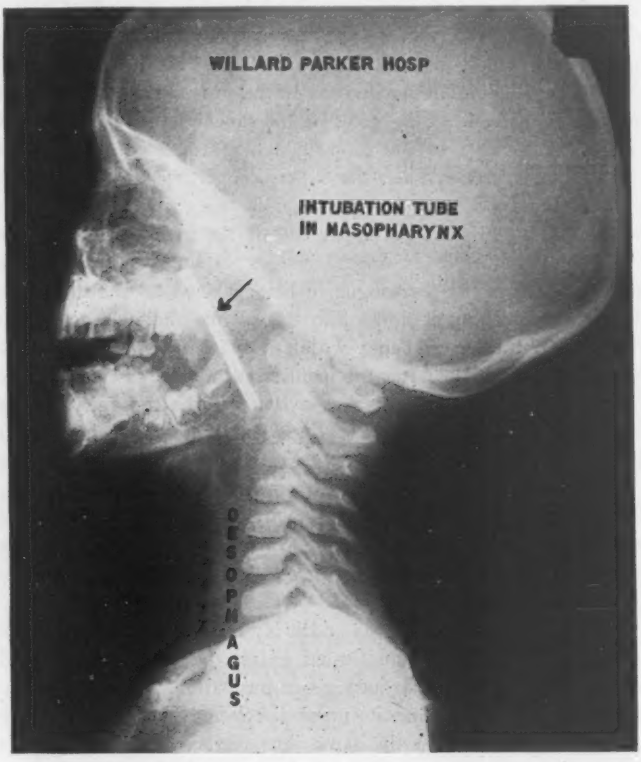


side is the sinus pyriformis, the junction of which marks the upper limit of the esophagus.

The larynx is connected with the surrounding structures by ligaments and muscles. It is attached to the hyoid bone by the thyrohoid ligament and posteriorly it is held in position by the laryngeal and pharyngeal muscles. The pharyngeal and thyrohyoid

muscles elevate the larynx while the sternothyroid muscle depresses it. Below, the larynx is connected with the trachea by the cricotrachean membrane.

Intubation. After the patient is placed in the prone position, properly immobilized by mummying, the jaws opened and secured with a mouth-gag, which is carefully held in place by an assistant, the first step is the retraction of the epiglottis forward against the



tongue. The epiglottis is more or less deceptive to the touch, as from the impression of its anatomy and its appearance from observation through a laryngoscope, one would expect it to feel larger than it actually does. To intubate successfully there must be a perfect co-ordination of both hands. The left index finger has a series of functions to perform at this time. It acts as a tongue depressor (Fig. 2), holds the epiglottis forward against the tongue,

acts as a guide in directing the tube and lastly releases the tube from the obturator and holds the tube in place in the larynx while the obturator is being removed. The tube arranged on its obturator, string to the right, and adjusted in the introducer, is grasped in the right hand. Following the left index finger, which among other things, acts as a guide, the tube is brought to the superior aperture of the larynx (Fig. 3). At this point, or perhaps shortly before, the obturator and handle are used as a lever with a changing fulcrum, so that the tube reaches the larynx at an angle which will cause the least trauma. This is the most important step in intubation, because if the proper angle is not taken and one does not keep the point of the tube well forward, the tube will find its way into the esophagus or traumatize the posterior wall of the larynx. When the superior aperture of the larynx is reached, the tube is passed into the larynx with a minimum of pressure (Fig. 4). As the upper end of the tube is being directed into the larynx the index finger changes its function from holding the epiglottis against the tongue to being placed on the upper part of the tube, pushing it down into the larynx and holding it there while the obturator is being withdrawn from the tube with the right hand (Fig. 5). After the mouth and oropharynx are cleansed with gauze and the patient takes a few breaths through the tube, the string is cut and removed (Fig. 6). If the tube has accomplished its purpose, the patient weary of its gasping fight for air, now being relieved of its stenosis, goes off to sleep.

Extubation. For some reason or other, extubation invariably seems to be more difficult to those learning than intubation. The only possible explanation we can offer is an over-anxiety to extract the tube in a hurry (Fig. 7).

When the stenosis is relieved and it is time for extubation, usually on the fifth day in uncomplicated cases, the patient is properly mummied and mouth held open, as in intubation. Again the index finger of the left hand has its many functions. It is placed on the head of the tube and at the same time retracts the epiglottis forward against the tongue. The extubator in the right hand is now passed along the left index finger, which acts as a guide, until the tip reaches the head of the tube (Fig. 8). The handle of the extubator is raised and the tip passes well into the lumen of the tube. This is most important. Then, and not until then, are the jaws of the extubator spread open, obtaining a firm hold on the tube (Fig. 9). The tube is then raised out of the larynx. As soon as the flange of the tube is clear (Fig. 10), the left index

finger is placed beneath it and acts as an auxiliary in assisting the tube as it is brought out through the cropharynx and mouth (Fig. 11).

Emergency Extubation. If the head of the tube cannot be readily palpated and is apparently being pushed down by the extubator, direct extubation, by laryngoscopy and a special extubator (Lynah), is indicated (Fig. 12). If this special extubator is not available or if the tube moves when it is being inserted, a wire bent so it has a small loop on the end which will pass through the lumen of the tube may be used. When the loop clears the lower end it will catch hold and the tube can be removed (Fig. 13). It will be noted that the loop has the wire bent so the mucous membrane of the larynx will not be traumatized in drawing it out. Gover has devised a similar method, but, instead of the loop, he used a long probe with a right angle bend—the end of which is rounded to prevent injury to the mucous membrane in extracting the tube. The bend is made small enough to pass through the lumen of the tube, and when it reaches the distal end, the handle is elevated so the bend catches and the tube is drawn out.

Complications. 1. One of the rare complications, we have seen but four cases, is for the tube to slip down the larynx into the trachea and then into the bronchus. This may be due to using too much trauma in attempting to extubate too small a tube, or a relaxed condition of the larynx (Fig. 14).

2. More frequently, the tube may be coughed up and pass into the naso-pharynx. Its position may be detected by digital examination, the lower end of the tube being felt in the cropharynx (Fig 15).

3. Still more frequently the tube is recovered from the bed or floor, or it may be discovered in the esophagus or swallowed, being passed on the third or fourth day after traversing the intestines. (Figs. 16, 17, 18, 19, 20, 21, 22.)

Occasionally after one tube has been coughed up and swallowed, the patient may have to be re-intubated, then cough up and swallow the second tube, having two tubes in the stomach at the same time (Fig. 23).

Summary. The purpose of this paper was merely to set before you the actual steps employed in the process of ordinary intubation, also the complications occurring during this procedure which are either mysterious or annoying. We have omitted the clinical indications for, and the complications of, laryngeal stenosis and other

conditions pertaining thereto, as we hope to present this some time in the near future.

The importance of the knowledge of the landmarks of the superior aperture of the larynx cannot be too strongly emphasized. Rapidity of action without haste in intubation and extubation is an absolute necessity.

We call attention to the fact that in removing a tube from the nasopharynx, should, by chance, the tube slip out of the fingers and be swallowed, there is no cause for alarm, as it will pass right on through the gastro-intestinal tract. We have known instances where as many as three tubes were in the intestines at one time and all passed without any inconvenience.

The most difficult procedure is to remove a tube that has a tendency to slip down the larynx. One must be able to recognize this condition early or the tube will get out of reach of the direct extubator. If in inserting the extubator the tube moves before it can be grasped, it is best to abandon that method and use the wire. Fortunately, this condition is rare. However, should the tube get down into a bronchus it is then necessary to do a tracheotomy and remove the tube in that manner.

GIANT CELL SARCOMA OF THE AUDITORY CANAL COMPLICATING MASTOIDITIS.

DR. WM. HERBERT, Brooklyn.

Malignant disease of the ear is not treated very extensively in the text books and in the recent literature not much has been seen in reference to cancer of this region. The treatment suggested has been radical surgery with removal of all the tissue assumed to be involved. Success from surgery in this region in the treatment of malignant growths is not great. The combined efforts of the knife and radium or X-ray is perhaps today the accepted method of combating the scourge. This method has yet to receive the acid test of time, but the results thus far obtained should give us more hope than we have had in the past.

The following history is of interest to those desiring information on the results of radium in malignancy of the ear:

*Accepted Nov. 14, 1922 for publication in The Laryngoscope.

H. B., male, aged 53, silver polisher, was seen at my office April 4, 1922, giving a history of pain in the right ear four days ago, followed by discharge and almost total deafness. Eight years previous he had a similar attack, at which time some growths were removed from the ear. The ear had been dry since that time.

Examination showed pus in the canal. The drum had a large perforation in the posterior half. Under hot irrigation and the instillation of 1.1000 acriflavin, the discharge stopped and the hearing returned. After four days the discharge and deafness returned. When seen at this time the canal was filled at the distal end with granulations. These growths returned almost as fast as they were removed. A Wassermann test was made at this time and was negative. About one week later a small swelling appeared on the superior wall about an inch from the canal opening. It resembled a furuncle, but was not red nor painful. It also looked as though the superior wall was sagging at that point. The mastoid was not tender nor did the patient complain of any pain. A small incision was made into the growth and no pus found. At this time, June 17, an X-ray examination was advised and the following report made: "On the right side there is a marked sclerosis of the bone and practically no cells visible. In this sclerosed bone I am unable to determine any definite area of necrosis. In the stereoptic films, however, it is possible to see an area of less dense bone above the tip, which may possibly be due to disease. It is almost impossible in a sclerosed mastoid to make a diagnosis of disease, and for this reason I am unable to say definitely whether this case ought to be operated upon or not. I believe you will have to be guided entirely by the clinical symptoms." Two days later, June 19, the patient was suffering great pain and the mastoid was extremely tender. Operation was advised and performed the following day. The mastoid was found somewhat sclerotic with no free pus in the cells until the middle ear was entered. The pus then escaped as though under great pressure. The wound healed promptly and the patient left the hospital in a week relieved of all pain. The operation, however, had no influence on the growth in the ear, which seemed to increase with great rapidity and was now accompanied by return of the great pain. Where the small incision had been made was now a large mass completely blocking the canal and bleeding freely when touched. A section was removed with a snare and referred to a pathologist for diagnosis, which was giant cell sarcoma.

The patient was now referred for radium treatment and on August 2 received his first exposure. This was followed by consid-

erable reaction with great pain. The second exposure was given September 7, and the growth then began to disappear rapidly, accompanied by healing of the open surface.

The patient was seen again by me on September 22, and the canal resembled a normal canal in every respect. There was no evidence at all of the growth having been present. There was a slight discharge from the middle ear and a small fistula at the lower end of the mastoid wound. On October 6, the fistula was still present and a few small pieces of bone removed with a small ring curette. The wound now had a deep purplish appearance. In the canal at the site of the original growth was a small sagging area which resembled the first growth in every respect. October 28, the patient was seen again and the sagging area had disappeared without any radium exposure. The canal was normal except for a slight watery discharge from the middle ear. The fistula was still present, but the mastoid region now looked healthy. No fragments of bone were found nor could any exposed bone be felt.

November 17, patient was again examined and found to be in a very satisfactory condition. The canal was dry and the mastoid wound entirely healed. No signs of the growth were present.

Radium is said to reach its highest efficiency in sarcomatous growths and in this case removed all evidence of the tumor. The permanency of the result is yet to be proved. The relief from pain and the suppression of the growth was obtained, but the case is too recent to class as a cure.

778 Putnam Avenue.

PRACTICAL CONSIDERATIONS OF ETHMO-SPHENOIDAL SINUSITIS, WITH LANTERN SLIDES OF ROENTGENOGRAMS.*

DR. J. H. HARTER, Seattle, Washington.

As the title suggests, this paper will deal only with those phases of ethmo-sphencidal sinusitis which are of practical importance in the management of these cases.

PROPHYLAXIS AGAINST SINUSITIS.

(a) Simple, scientific treatment of acute coryzas will avert most of the cases of sinusitis. It is our duty therefore to educate our patients and the public to take treatment for an acute cold.

(b) As a prophylactic measure against sinusitis it is of great importance to educate the individual not to blow the nose forcibly. Undoubtedly our sinuses would be less frequently infected if, as in the lower animals, it were impossible for us to close our nostrils and snort into them. Every sensible patient can be taught to blow the nose gently, keeping only one side closed at a time.

(c) Personally I believe that, except in ozena, aqueous nasal douches should not be used. From theoretical consideration and clinical experience I am convinced that such douching, especially of an acutely inflamed nose, increases the danger of sinusitis. This applies also to the practice of snuffing fresh or salt water into the nose while bathing.

(d) As prophylactic treatment, too, may be classed the removal of any intranasal obstruction to ventilation or drainage, such as a septal deviation or spur which is encroaching upon the lateral wall of the nose.

CLASSIFICATION OF THE COMMON INFLAMMATORY PROCESSES OF THE SINUSES.

1. Acute catarrhal inflammation.
2. Acute suppurative inflammation.
3. Chronic catarrhal inflammation.
4. Chronic suppurative inflammation.
5. Hyperplastic inflammation with or without polypi.
6. Ozena.
7. Vacuum disorders.

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*Given before the Tenth Annual Meeting of the Pacific Coast Oto-Ophthalmological Society with the Western Section American Laryngological, Rhinological and Otological Society. Salt Lake City, Utah, Sept. 15, 1922.

*Accepted Dec. 19, 1922 for publication in The Laryngoscope.

8. Tuberculous inflammation.
9. Luetic inflammation.
10. Neoplasms.

Practically all the cases, at least ninety-nine per cent, in private practice fall within the first six of the above classes.

DIAGNOSIS AND PRACTICAL REMARKS.

Acute Catarrhal and Acute Suppurative Inflammation: Considering these two classes together, it may be stated that the diagnosis is easy. There is an acute head cold with discomfort or pain between the eyes or in the occipital region and oftentimes fever and other signs of systemic disturbance.

Chronic Catarrhal and Chronic Suppurative Inflammation: The diagnosis of chronic catarrhal or chronic suppurative inflammation is easy if the discharge is copious in amount. However, with a scanty discharge the diagnosis may be very difficult. Oftentimes repeated examinations are necessary, especially in the morning, instructing the patient not to clear the nose previously. Suction may reveal pus where it is otherwise not visible. The presence of the dilatation of small vasa in the post-ethmo-sphenoidal region is suggestive of chronic discharge here.

I would evaluate the diagnostic finding for any type of chronic ethmo-sphenoiditis as follows:

(1) The visible evidence obtainable from the nasal cavities, pharynx, and epipharynx. This in nearly all cases must form the criterion for diagnosis. The nasopharyngoscope is extremely useful for viewing the ethmo-sphenoidal region.

(2) The Roentgenogram. There is a small percentage of the cases of chronic ethmo-sphenoiditis, especially of unilateral involvement, in which the Roentgenogram taken anteroposteriorally, or obliquely, or stereoscopically, will show the disease definitely. The Roentgenogram gives, too, valuable evidence of the antomical size and shape of these cells in the individual case. However, cases of marked chronic suppuration may show a clear Roentgenogram, while clinically normal cases may show very cloudy pictures.

The more I see of these cases, the more do I become convinced that the diagnostic evidence obtained by Roentgenogram must in the great majority of cases be confirmatory only to the evidence obtained by vision from the nasal and pharyngeal cavities.

(3) Pain. We are all familiar with text book pains of ethmoidal and sphenoidal congestion. We should all be familiar with, and on the lookout for, cases of vidian neuralgia due to sphenoidal inflammation. This will be spoken of later.

There is an important relationship between latent syphilis and chronic suppurative sinusitis. It have seen several patients with an ordinary chronic suppurative sinusitis who were known to be syphilitic because of a positive blood Wassermann or a positive history. All of these were cases of pansinusitis and in each case there was marked improvement of the sinusitis upon the administration of salvarsan and mercury. In one of these cases recently, although the blood Wassermann was negative, the improvement of the sinusitis was marvelous. For the past four years I have made it a rule to do a blood Wassermann and examine carefully for signs of syphilis in each case of chronic suppurative sinusitis.

Hyperplastic Inflammation: This condition seems dependent upon a prolonged disturbance in the nutrition of the tissues of ethmoid

1 2

Fig. 1. Correct position for Transplant (2 months after operation).
Fig. 2. Two years and 4 months after operation. Note increased growth of bone at periosteum contacts.

and sphenoid. Probably frequently recurring attacks of acute inflammation are a common etiology. Poor ventilation may act as a local cause.

Pathology: Early there is hyperemia with outpouring of serum into the interstitial spaces of the connective tissue. If mild, the process stops here and this condition may persist for years. If the process advances, the infiltration of serous elements becomes greater and a mucous polyp soon forms. The process may remain stationary with only slight polypoid degeneration of mucosa or may advance to the formation of large polypi. Thus hyperplastic inflammation gives rise to several different pathological pictures. Within this class of hyperplastic inflammation several clinical types are found:

(a) Hyperesthetic rhinitis type. This simulates hay-fever, but comes on at any time of the year. These cases must be carefully differentiated as to etiology, for the same clinical picture can be produced by septal points of pressure, by focal infection, by defective circulation as in cardiac disorders or by a lowered condition of the general health.

(b) Type of nasal polypi formation: In this type of hyperplastic inflammation numerous polypi are seen growing from the ethmo-sphenoidal region. This condition is usually accompanied by considerable mucoid or mucopurulent discharge. The disease is nearly always bilateral. The diagnosis of these cases is extremely easy.

3

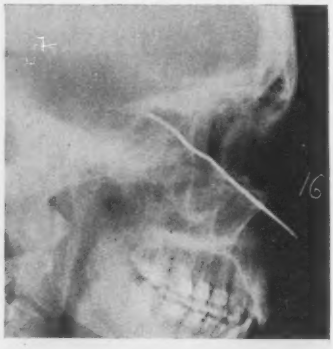

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Fig. 3. Case in which infection occurred but was controlled. Shows spot of absorption. Seven months after operation. Deformity in this case did not recur.
Fig. 4. Bone transplant two years after operation. (Congenital Deformity.) (Old case.)

(c) Type of disturbed function in the adjacent nerves. It is well established that hyperplastic inflammation in the post ethmo-sphenoidal region may have an influence upon the nerves which lie in contact with the bony walls of these sinuses. Dr. Sluder treats this subject exhaustively in "Headaches and Eye Disturbances of Nasal Origin."

The three nerves which pass through bony canals in close relation to these cells are especially apt to be affected. These are the optic, the maxillary and the vidian.

I have never seen a case of maxillary neuralgia dependent upon ethmo-sphenoidal disease. Vidian neuralgia, due to sphenoidal inflammation (hyperplastic or chronic suppurative), is not uncommon. In this syndrome there is pain at the bridge of the nose, radiating to

the face, behind the ear, down the neck, and sometimes into the shoulder, arm and hand of the affected side. We should be familiar with this pain-complex and constantly on the lookout for such cases. Many of these sufferers have sought for help over a long period of time without even getting a diagnosis. I know of no diagnosis which is more definite or more easily made.

The cases in which the optic nerve is encroached upon by hyperplastic inflammation fall into two groups:

(Group 1) Cases showing asthenopia, gradually failing vision and gradual enlargement of the normal blind spot.

(Group 2) Cases of sudden blindness. The record of such a case is about as follows: A patient who has had no previous eye

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6

Fig. 5. Bone transplant four years after operation (Congenital Deformity). Same as Fig. 4.
Fig. 6. Six years after operation. Same as Figs. 4 and 5.

trouble suddenly becomes partially or totally blind in one eye. Upon examination the eye appears normal, or there may be blurring of the edges of the optic disc or, in a very severe case, some swelling of the nerve head. If any vision is present a large central scotoma can be demonstrated. Examination of the nose is practically negative, no discharge, no polypi, no cloudiness of the sinuses, breathing space good. General examination negative.

With such cases (Group 2) if nothing is done a small percentage will regain normal vision. However, in the great majority of cases there will occur in from six to thirty-six days pallor of the disc (optic atrophy) and the patient goes on to permanent blindness. If ethmo-sphenoidal exenteration is done early the vision quickly returns to normal and remains so; if the operation is delayed, usually

only part of the vision returns. Such a case is a distinct emergency; diagnosis must be quickly made and treatment instituted early.

Let us suppose that a case of vidian neuralgia or sudden blindness is referred to the rhinologist for a diagnosis of the intranasal condition and for the probable causative relation of this to the neuralgia or blindness.

Let us suppose that in this hypothetical case there is within the nose good breathing space, no discharge, and no polypi present. How are we to determine whether or not this is a case of hyperplastic ethmo-sphenoiditis?

Text-books tell us of slight color changes or thickening of the mucosa occurring in this condition, but these changes are so delicate that we will never reach any agreement upon them. What one specialist calls abnormal, another will call normal, and vice versa.

There is, however, an easily determined pathological condition which I have found present in each one of these cases, as follows: After complete shrinkage of the intranasal soft tissues by cocaine adrenalin solution there still exists no free space from the level of the lower border of the middle turbinate upward. The upper posterior portion of the nose is completely filled with tissue.

Given a case of vidian neuralgia or sudden blindness (as described above) and this intranasal finding positive, the diagnosis becomes clearly that of nerve disturbance due to hyperplastic ethmo-sphenoiditis.

TREATMENT AND CONCLUSIONS.

For acute catarrhal and acute suppurative inflammation conservative treatment should be used unless an emergency arises. This treatment should include general hygienic care, depletion of the circulation and shrinkage of the soft tissues within the nose.

Chronic catarrhal cases, with only small amount of discharge, are best treated by palliative measures.

As to results obtained from ethmo-sphenoidal exenteration, in cases where this treatment seemed indicated, I will present an analysis of the end results of 31 operated cases, as follows:

Chronic suppurative ethmo-sphenoiditis, 11 cases; unilateral, 4; cured, 3; improved, 1; bilateral, 7; cured, 0; improved, 7.

Hyperplastic ethmo-sphenoiditis, 18 cases; unilateral, 8; cured, 7; improved, 1; bilateral, 10; cured, 10.

Ozena, 2 cases; bilateral, 2; not improved, 2.

From these statistics the following conclusions are drawn for this group of 31 cases:

1. Two types of chronic suppurative inflammation gave very happy post-operative results. (a) Suppuration limited to a few cells or to one side. This seemed to indicate poor local drainage and good general resistance and after operation the nose quickly returned to normal. (b) Generalized suppuration with poor health or other signs of focal infection. After operation the focal infection ceased, although there still remained some slight discharge from the nose.

2. Hyperplastic inflammation gave practically 100 per cent cures by operation.

3. Ozena cases in my hands were not benefited by operation.

Remarks concerning operation on hyperplastic cases: If there are only a few polypi present and no other symptom but nasal obstruction, simple removal of these will bring relief. If, however, there is evidence of involvement of the entire ethmo-sphenoidal area, a complete intranasal exenteration should be done upon the ethmoids and sphenoids. This is urgently indicated if accompanied by beginning catarrhal deafness, laryngitis, asthma, failing of the general health, etc. Ethmoidal exenteration in hyperplastic inflammation is never followed by abnormal dryness of the nose or throat.

As stated above, there is in this type of inflammation a thinning of the bony intercellular walls. For this reason the intranasal exenteration may be easily, safely and completely done, and after this polypi do not reform.

If such a case is treated by removal of the polypi and opening of a few ethmoidal cells, and after some months when the polypi recur this same operation is repeated, then the ethmoidal area becomes filled with dense, tough scar tissue, which renders the complete intranasal ethmoidal exenteration absolutely impossible.

I believe that the surgeon who in such a case exenterates only part of the ethmoidal cells has done the patient an infinitely greater injustice than has the surgeon who removes only part of a diseased tonsil. It is a not uncommon, yet certainly a most pathetic, sight to see a wretched chronic asthmatic with the ethmoidal region full of small polypi enmeshed in dense scar tissue. In such a case someone's timidity is responsible for much of the patient's discomfort.

THE BACTERIOLOGY OF INFECTED NASAL ACCESSORY SINUSES.

DR. WILLIAM E. CARY AND DR. EDWIN MCGINNIS, Chicago.

Many observers have noted great systemic improvements in patients who have had some nasal infection that has been cleared up by operative treatment. Even so slight a procedure as lavage of the maxillary antrum has started marked improvement in the general health. In routine examinations of the upper respiratory tract, one is impressed by the slight pathological changes even when pathogenic bacteria may be found. One often observes, after surgical treatment, distinct improvement, even in such cases. This fact led to a systematic study of the bacteriology of sinuses after operative measures in order to correlate, if possible, the local lesion, the systemic condition and the bacteriologic results. It is hoped that eventually this may help to obtain more uniformly good results from surgical treatment in properly selected cases.

It has been recognized long, that the nasal sinuses may be the site of focal infection as well as the teeth, tonsils, skin, etc.; but very little work has been done on the bacteriology of these regions either in health or disease.[1] Bloomfield studied the upper air passages in eight normal persons and found staphylococcus albus, some of which were hemolytic in each case, diphtheroids in six and various other transients. He thinks that staphylococcus albus is a normal inhabitant of the nose, but that staphylococcus aureus is associated with chronic sinus infection. During "colds" in ten cases, he found the normal flora present but the numbers greatly increased. In one case of chronic ethmoid infection, staphylococcus albus was present in abundance. Tunnecliff[2] describes an anerobic bacillus in 98 per cent of cases of acute rhinitis and in 90 per cent of cases of chronic rhinitis. Walker and Adkinson[3] examined the sputum and nasal secretions in 60 cases of bronchial asthma (45 sputum, 15 nasal secretions) and found staphylococcus aureus 14 times, staphylococcus albus 15 times, staphylococcus citreus, micrococcus tetragenus and micrococcus catarrhalis each 2 times. The staphylococci were usually in pure culture in the nasal secretions and predominated in the sputum. The serum of the patients often agglutinated staphylococcus, aureus, but never staphylococcus albus.

This report covers 25 cases of sinus infection; nearly half were cases of asthmatic bronchitis with ethmoid involvement. The ma-

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TABLE I—Cary and McGinnis

Case	Clinical Diagnosis	Throat and Nose Examination	Source of Culture	Organisms Present	Treatment Nasal	Early Results
A. K.	Asthmatic Bronchitis	Double maxillary, ethmoid and frontal infections	Maxillary Washings	Streptococcus viridans	Sub-mucous recection, ethmoid drainage, Irrigation	Marked Improvement
J. C.	Asthmatic Bronchitis, Chronic Nasopharyngitis, Migraine	Popyp right Ethmoid, Profuse thin discharge	Base of Ethmoid cell	Staphylococcus aureus hemolytic. Diplobacilli gram†	Drainage of right and left Ethmoid	Improved
F. F. S.	Bronchial Asthma Chronic Bronchitis	Deflected Septum Ethmoid infection Both antra dark	Swab from right nares	Staphylococcus albus	None	
M. G.	Asthmatic Bronchitis	Right and Left Ethmoiditis Left antrum infetcion	Base of Ethmoid cells	Staphylococcus aureus	Drainage of both Ethmoid, irrigation left antrum	Marked Improvement
C. B.	Chronic Otitis media. Frequent colds	Ethmoiditis	Ethmoid bullae	Staphylococcus aureus hemolytic and non-hemolytic	Sub-mucous recestion, drainage of Ethmoids	
J. L.	Colitis	Deflected septum Right and left Ethmoiditis	Left Middle Meatus	Staphylococcus aureus	None	
E. R.	Asthmatic Bronchitis	Right Ethmoiditis Right antrum infection	Ethmoid cells	Staphylococcus aureus hemolytic	Drainage of both Ethmoids. Irrigation of both antra	Marked Improvement
G. T.	Headache, Catarrh Migraine	Deflected septum Right Ethomoiditis	Front of Bulla	Staphylococcus albus	Drainage of ethmoids	
E. M.	Acute Rhinitis, Chronic Arthritis	After drainage of ethmoids	Middle Meatus	Staphylococcus albus	Post operative Ethmoid drained 6 months	Arthritis cleared up after drainage
M. M.	Left sided Headache, Postnasal discharge		Common Meatus, Middle Meatus	Staphylococcus aurues hemolytic Staphylococcus albus	Unoperated	
M. S.	Sub-acute Bronchitis	Double ethmoiditis Right antrum infection	Left Middle Meatus	Staphylococcus aureus	Unoperated	
M. V.	Bronchitis Colitis	Slight discharge in middle meatus. Acute ethmoiditis. Slight tonsilitis	Middle Meatus	Staphylococcus albus	Nothing	
M. B.	Asthmatic bronchitis Frequent colds	Deflected septum Double ethmoiditis	Left Middle Meatus	Staphylococcus aureus	Unoperated	
P. S.	Asthmatic Bronchitis		Left Meatus Right Middle Meatus	B. coli Staphylococcus aureus, (slightly hemolytic)	Unoperated	

M. B.	Asthmatic bronchitis Frequent colds	Deflected septum Double ethmoiditis	Left Middle Meatus	Staphylococcus aureus	Unoperated	
P. S.	Asthmatic Bronchitis		Left Meatus Right Middle Meatus	B. coli Staphylococcus aureus, (slightly hemolytic)	Unoperated	
M. E.	Acute frontal Sinusitis	Frontal sinusitis Ethmoiditis	Ethmoid cells	Staphylococcus aurues, slightly hemolytic	Drainage of frontal and ethmoids	Marked Improvement
M. H.	Osteo Arthritis Colitis	Left Ethmoiditis	Right Ethmoid cells. Left Ethmoid cells.	Staphylococcus aureus hemolytic. Streptococcus viridans, Anaerobic gram bacilli	Ethmoid drainage	Marked Improvement
M. Sh.	Asthmatic Bronchitis	Left fronto-ethmoid-antral infection	Left Bulla Right Bulla	Staphylococcus albus Staphylococcus albus Micrococcus tetragenus	Ethmoid drainage	Marked Improvement
M. R.	Chronic laryngitis. Left Headache	Left fronto-ethmoidal infection	Ethmoid cells	Staphylococcus aurues	Ethmoid operation	
M. Go.	Headache	Left Ethmoiditis	Sphenoid Ethmoid cells	Staphylococcus aurues, B. Hoffmanni Staphylococcus aureus	Ethmoid operation	Marked Improvement
G.	Osteo Arthritis	Right and Left Ethmoiditis	Ethmoid cells	Staphylococcus albus Diphtheroid	Ethmoid operation	
M. P.		Right and Left Ethmoiditis Deflected Nasal Septum	Ethmoid cells	Staphylococcus aurues Staphylococcus albus	Ethmoid operation	
Hur.	Acute Nephritis	Left Antrum tonsillar infection	Left Antrum	Staphylococcus aurues Staphylococcus albus	Tonsillectomy Irrigation of Antrum	
M. K.	Asthmatic Bronchitis	Right and Left Ethmoiditis	Right and Left Ethmoid cells	Staphylococcus aurues B. coli Streptococcus viridans	Ethmoid drainage	
			Right and Left	Staphylococcus	Ethmoid drainage	

M. K.	Asthmatic Bronchitis	Right and Left Ethmoiditis	Ethmoid cells	aurues B. coli Streptococcus viridans	
Gart.	Asthmatic Bronchitis	Right and Left Ethmoiditis	Right and Left Ethmoid cells	Staphylococcus aurues	Ethmoid drainage
Mas.	Acute frontal and Ethmoid sinusitis	Left frontal and Ethmoiditis	Left Ethmoid cells. Left frontal discharge.	Staphylococcus aurues. Spore bacilli Few Streptococcus	Irrigation of frontal Ethmoid drainage

terial was obtained at operation. The bases of the removed ethmoid cells were dropped in sterile dextrose broth from which blood agar plates and anerobic cultures were made. In unoperated cases, cultures were taken on a sterile swab from the middle meatus or from washings from the maxillary or frontal sinuses and similarly cultured. The clinical conditions for which treatment was sought were asthmatic bronchitis 10; headache 4; arthritis 3; frequent "cold," colitis and acute sinusitis each 2; and acute nephritis and subacute bronchitis each 1.

Table I gives a resumé of the results of the bacterial findings. It may be seen that in 14 cases a pure culture was found. Of these cases, 3 showed a hemolytic staphylococcus aureus, 6 a non-hemolytic staphylococcus aureus, 4 staphylococcus albus and one streptococcus viridans. In all but one case, either staphylococcus aureus or albus was found in pure or mixed culture. Other organisms found were bacilli in 5 cases, streptococcus viridans in 3 and micrococcus tetragenous, B. coli and an anerobic bacillus in one case each.

Preliminary experiments to determine the virulence and localization of the organisms have been made. In the few strains of staphylococcus tested, there was no evidence of pyogenic properties as has been shown in staphylococci isolated from osteomyelitis or other suppurative processes. Injections were made intravenously in rabbits, using small amounts of the living organisms. One strain of hemolytic staphylococcus aureus was injected in four rabbits and produced acute broncho-pneumonia. In one of these animals there was a villous, obliterative pericarditis set up similar to that seen in man as a terminal event in chronic nephritis. Three other strains of staphylococcus aureus from ethmoidal infections produced acute changes in the kidneys and lungs, but no evidences of metastatic abscesses. These strains produced an early death following small injections (1/50 to 1/12 of a 24 hour slant culture). Other organisms injected over 3 or 4 month periods showed no such virulence. Two such strains were streptococcus viridans from sputum and ethmoid infections and one a bacillus isolated from catheterized urine of a case of chronic nephritis. B. coli from a case of cystitis was highly toxic and killed a rabbit in 24 hours with slight pathological changes.

The outstanding features in the work on ethmoid infections up to the present time are:

1. The frequency of pure cultures of staphylococci (over 50 per cent of cases).

2. Absence of pyogenic properties of these nasal staphylococci in rabbits.

3. Frequent involvement of the kidneys, heart and lungs when ethmoidal staphylococci are injected intravenously in rabbits.

It may be noted here that marked improvement in systemic conditions and especially of asthmatic bronchitis may follow ethmoidal drainage.

[1]Bull. Johns Hopkins Hospital, 1921, 32, p. 290.
[2]Jour. Infect. Dis., 1915, 16, p. 493.
[3]Jour. Medical Research, 1917, 35 p. 373.

REPORT OF CASE OF STATUS LYMPHATICUS WITH AUTOPSY FINDINGS.

Dr. Chas. L. Stone, Brooklyn, N. Y.

The following case is reported without comment or elaboration as the record itself serves as a complete exposition of this rather unusual condition:

The patient, Sam Capula, an Italian, aged 20 years, came to the laryngological clinic of the M. E. Hospital, complaining of inability to breathe through his nose, shortness of breath on exertion and "swelling of his tonsils which made swallowing difficult."

Examination revealed a septum deflection with considerable hypertrophic rhinitis, causing almost complete nasal obstruction; a considerable adenoid deposit in the epi-pharynx, and extremely large hypertrophied tonsils protruding well beyond the pillars. There was no discrete enlargement of the cervical glands, although the submaxillary region seemed full. He was sent into the hospital for relief of his throat and nasal condition and it was decided to do first a tonsillectomy and adenoidectomy under general anesthesia (ether) at his own insistence.

Pre-anesthetic examination in the hospital revealed nothing abnormal beyond the original findings. Heart and lungs were apparently normal. From the beginning of anesthesia, however, there was considerable difficulty in breathing which the anesthetist thought to be obstructive. At one time the patient stopped breathing and became cyanotic. Pulling forward of the tongue and the administration of oxygen for a few minutes cleared up this difficulty and the patient was then completely anesthetized without further trouble.

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The operation planned (T. and A. with dissection and snare) had proceeded only to the insertion of the mouth gag and the grasping of the tonsil with the tenaculum—which produced slight bleeding—when the patient once more stopped breathing and became cyanotic. Attempts were made to pull forward the tongue, but this seemed suddenly to swell to enormous proportions and completely block the pharyngeal air way. Rapid tracheotomy was therefore done and, thinking that blood or some other foreign material had plugged a main bronchus, the bronchoscope was inserted through the tracheotomy wound and the entire interior of the bronchi inspected. Nothing was found, however, and furthermore (in spite of the considerable enlargement of the thymus later found) there was no evidence of thymus pressure upon the trachea. Following the opening of the trachea, oxygen was forced through a tracheal tube and artificial respiration continued for a considerable time, but in spite of this and other means of resuscitation which were successively applied the patient expired.

The following is an exact transcript of the autopsy report given by Dr. E. B. Smith, the hospital pathologist:

"The body is that of a young Italian of 20 years. It is 68½ inches in height, weight 150-160 pounds, slender and well formed. There is a recent tracheotomy incision. Thorax: Pigeon breast deformity. Lower part of thorax from 6th rib down compressed. Lungs: Left is bound down with old adhesions. Right is also partly adherent. There are several enlarged peri-bronchial lymph nodes. Thymus: Persistent. Weighs 30 gms. Heart appears small. Weighs 300 gms. Aorta narrow. Only 5.3 cm. in circumference. Abdomen: Spleen weighs 225 gms. It is quite soft and mushy and the malphygian bodies are unusually prominent. Kidneys weigh 125 gms. each and are not remarkable. Liver and stomach are normal. All of the mesenteric nodes are enlarged. On section they show a simple hyperplasia. The ileum presents a rather remarkable appearance. All of the lymph follicles are greatly enlarged so that the mucosa is studded with nodules varying from 1 to 6 mm. in diameter. The inguinal, axillary, cervical and epi-trochlear glands are enlarged and on section show a simple hyperplasia. Diagnosis: The small heart, narrow aorta, large thymus, general lymphatic hyperplasia and characteristic hyperplasia of the intestinal lymph nodes make a complete picture of status lymphaticus."

471 Clinton Avenue.

A CASE OF IVORY-LIKE OSTEOMA ORIGINATING FROM THE OS PLANUM AND INVADING THE ORBIT.

Dr. Harris H. Vail, Cincinnati, Ohio.

The ivory-like form of osteoma of the orbit is a rare condition. Pathologists agree in the opinion that these tumors are benign and often originate in the nasal accessory sinuses.

The following case of osteoma of the orbit is reported in view of the ease with which a tumor in this region was removed and certain other results which, at the time of operation, were unexpected.

The patient, Miss G. H., age twenty, first consulted me April 6, 1922 having been referred to me by my father, Dr. D. T. Vail. The following history was obtained: One year ago patient first noticed exophthalmos in the left eye, a gradual onset. There has probably been very slight increase in the exophthalmos but patient, however, states she has not noticed any change in the last year, except that when she would have a cold the exophthalmous seemed to be more marked. Six months ago patient noticed that she had lost the vision in her left eye. She had never noticed any diplopia. Apparently patient did not notice loss of vision until it had completely disappeared. She has not had any severe colds, nasal obstruction, or discharge this winter. Quite frequently she has had dull headaches on the top of the head, none between or over the eyes. There has been no post-nasal discharge. There has been no loss of weight. Patient has felt well and continued at her work as elevator girl. About three weeks ago, while at her work, she noticed a very severe pain at the inner canthus of the left eye. This pain lasted off and on for about one week. The pain did not bother her at night. Movement of the eyes made the pain worse. Two weeks ago the left eyelids were swollen shut and for a period of four days she felt so sick that she could not sit up in bed. There was a little vomiting at this time. No known fever.

Examination showed exophthalmos of the left eye. Patient was entirely blind in the left eye with marked primary optic atrophy. Cornea and media were clear. There was a marked

*Accepted Oct. 20, 1922 for publication in The Laryngoscope.

limitation of ocular movements. The septum was deviated sharply to the right with the right middle turbinate somewhat enlarged and boggy. No pus anywhere in the nose. Nasopharynx showed no enlargement of the posterior tips of the turbinates. No pus. There were a few flat adenoid masses. Tubal orifices were normal. The tonsils showed nothing remarkable. No cervical adenitis was present. The larynx was

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Figure 1. Showing appearance of the patient before operation. The exophthalmos and downward displacement of the left eyeball is well shown.
Figure 5. Showing the appearance of the patient three months after operation.

normal. Transillumination showed both antra bright. The anterior ethmoid region on transilluminating with the Holmes nasopharyngoscope in the nose showed up equally bright. On account of the exophthalmos it was impossible to transilluminate the left frontal sinus properly. On palpation of the orbit one could distinctly make out a firm rounded mass in the upper inner part of the orbit.

At that time I advised X-rays of the nasal sinuses and head. This examination was done by Dr. Sidney Lange of Cincinnati, who reported, on April 7th, an irregular bony growth involving the left ethmoid region and mesial portion of the left orbit. Frontal sinuses, antra and sphenoids reported clear.

In the short interval between the first examination and the time of operation the patient's symptoms had remained station-

Figure 2. The radiogram in the antero-posterior position showing very well the outlines of the tumor and its apparent involvment of the ethmoid region. The deviation of the septum to the right is well shown. It is possible to make out erosion of the floor of the frontal sinus with slight clouding of the sinus and penetration of the antrum by the tumor mass.

ary except that from time to time she would suffer rather sharp headaches over the left eye. After studying the X-ray plates I came to the conclusion that the tumor was primary in the ethmoid and had involved the orbit secondarily so with this in mind on May 23, 1922 I operated, making the usual incision as in the Killian operation. Dr. D. T. Vail assisted me. Ether was given by Dr. C. L. Hans.

The following notes are from my own operative notes; The usual curved incision was made through the eyebrow and along

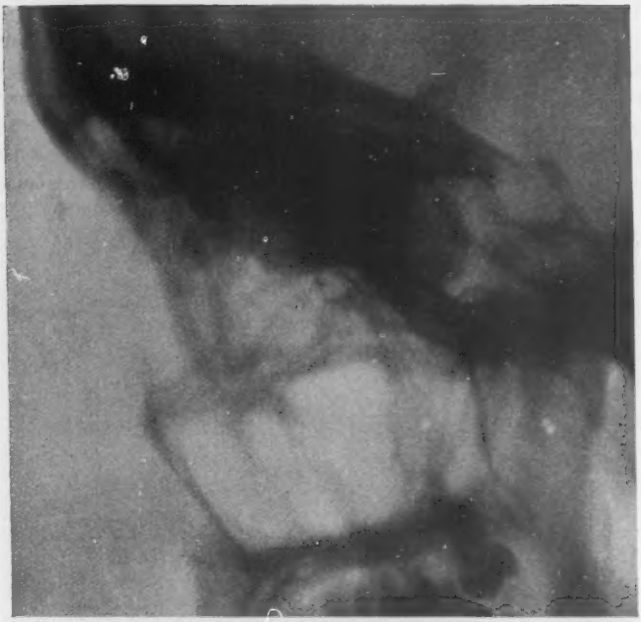

Figure 3. A lateral view with the left side of the head down showing an apparent involvment of the sphenoidal sinus. As a matter of fact the tumor extended as far back as the plane of the sphenoidal sinus but the tumor, being entirely orbital, did not involve the sphenoidal sinus. Stereoscopic exposures would probably have shown the true picture.

Figure 4. This shows the point of origin of the tumor in the os planum. This portion of the os planum can be seen in the tumor specimen and is fairly well shown in the photograph.

the bridge of the nose as in the Killian operation, down through the subcutaneous tissue and periosteum to the bone. The periosteum of the lacrymal bone and the os planum was elevated and soon the tumor was disclosed. The orbital contents were retracted downwards and outwards. The tumor was of hard bone and at first seemed a part of the os planum and the orbit. It was necessary to chisel away the ascending process of the superior maxilla and the floor of the frontal sinus. At this stage

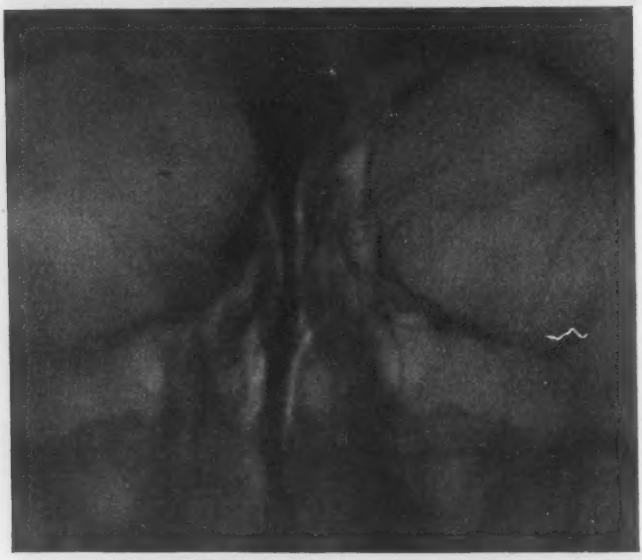

Figure 6. Antero-posterior radiogram of the patient about three months after operation showing a complete removal of the tumor. Contrasting this radiogram with that prior to operation, one sees the shadow, which in the latter case involved entirely the region of the left middle turbinate, has disappeared and we now see a normal-looking middle turbinate which lies in close relation to the septum which is deviated as before to the right.

a few drops of thick pus from the frontal sinus were encountered. The attachment of the tumor was to the os planum and at first it seemed as if it were impossible to remove the tumor on account of its apparent union with the orbital walls. However, with a chisel I cut away the os planum in the region of attachment and with elevators loosened the tumor from its bed. In doing this an area of dura about a centimeter in circumference on the inner upper wall of the orbit was exposed. The

dura was normal. The tumor was rocked back and forth and finally completely lifted from its bed. Its only point of attachment was to the os planum. The tumor extended nearly to the lateral wall of the orbit and deeply towards the apex and involved the floor of the orbit so that it had been eroded.

It was not necessary to remove the eye or any of the orbital tissue. At one place a little orbital fat presented, but the

Figure 7. A left lateral view of the patient following operation showing no evidence of remaining tumor.

amount of orbital fat was surprisingly small and it was due to this latter fact that the exposure of the tumor was greatly facilitated. The wound was closed with interrupted subcutaneous No. 1 plain catgut and interrupted silk sutures to proximate the skin. No drain was inserted.

The tumor weighed 25.33 grams. It measured 4.4 cm. x 4.4 cm. x 4.6 cm. and 2.5 cm. from its point of attachment to its outer free surface. It was of hard ivory-like bone, lobulated, roughly triangular and accomodated to the cavity in which it

was growing. The tumor, being subperiosteal, probably involved the optic nerve through indirect pressure. The specimen removed showed a portion of the os planum adherent to it. Photographs were taken of the tumor and these show its size as well as its attachment. The ethmoid cells were not involved as the tumor originated on the orbital side of the os planum and grew into the orbit. The tumor involved the left frontal sinus and the antrum only through pressure against their walls. This was sufficient to have caused erosion of the floor of the frontal sinus and the roof of the antrum.

Following the operation, patient made a good ether recovery and the surprising and pleasing fact was ascertained that she perceived light in her left eye. The second day there was considerable reaction of the eyelids with chemosis and temperature of 100°. Outer canthotomy, upper and lower eyelids, was done by Dr. D. T. Vail. The third day there was present swelling and redness with temperature to 101°. The incision in the eyebrow region was opened up and about one-half ounce of thick pus evacuated. A gutta percha drain was inserted. In spite of all this reaction the cornea remained clear. Patient could count fingers at three feet.

Following this, patient did fairly well. The drain was removed and the reaction subsided so that she was discharged from the hospital June 4, 1922. At this time there was a tender swelling at the inner margin of the left lower eyelid with chemosis vision as before. Patient had a large central scotoma but named objects at two feet.

In the next week the patient was seen daily by my father and myself and it was necessary for him to make a deep incision through the lower eyelid into the orbit evacuating considerable pus. Gradually after two or three weeks treatment the infection in the orbit quieted down and the incision healed up so that patient was soon afterwards discharged from further need of post-operative treatment.

On August 10, 1922 patient was again seen and showed a healed incision with considerable enophthalmos. Cornea and media of the left eye were normal. Optic nerve showed optic atrophy. Vision was fingers at twelve feet. Patient had a central scotoma, the peripheral field being normal. Motions of the left eyeball were slightly restricted. There was returning ability of the patient to raise the left upper eyelid. For quite a while

after the operation she had had complete ptosis of the left eyelid.

The X-rays of the patient taken before and after operation are shown. These plates give an excellent idea of the size, shape, and location of the tumor and also show that there is no evidence of tumor remaining in the orbit. Photographs of the patient before and after operation are also shown. These show, in a fashion, the enophthalmos. This enophthalmos is due chiefly to atrophy of the orbital fat and it is not known whether this fat in this particular case will reform or not. In the event that the obital fat should reform the patient's disfigurement would be very slight.

A remarkable thing about this case is the rapid return of vision following the operation in an eye which, to the patient's best knowledge and belief, had been sightless for six months. The patient perceived light with the left eye the day following operation and this vision steadily improved so that three months after the operation patient could count fingers at twelve feet. It is doubtful whether the central scotoma will entirely disappear.

This method of surgical approach to an osteoma of the orbit primary in the ethmoid region gave an excellent exposure and allowed the operator to get at the point of origin of the tumor and in this manner save the orbital contents from operative trauma. There is no doubt but what this tumor could have been easily removed following enucleation of the eye but in this particular case even with a sightless eye it was thought advisable, for the best interests of the patient, to attempt a removal of the tumor in the way that was done.

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THROAT AND EAR SYMPTOMS IN RHEUMATIC CASES

DR. DOUGLAS MACFARLAN, Philadelphia.

Gouty and rheumatic diseases exhibit themselves in so many and so varied systemic manifestations that it has been difficult to classify them satisfactorily. Yet there is back of nearly every case as it presents itself an elusive symptomatic atmosphere that, though it cannot be defined very satisfactorily, nevertheless leads the observer subconsciously toward correct diagnosis. In mentioning ear and throat complications I will not refer them to particular types of these disease manifestations, for as a matter of fact they seldom follow or appear in one given type more than another. I have had the fortune to see a great number of patients suffering from all varieties of rheumatic and gouty diatheses, that is, suffering from the more general complaints of these diseases, and it is in these cases that I have been able to pick up the symptoms referrable to the ear and the throat.

First of all, it should be said that it has been our experience that throat and ear complications of gout and the various forms of rheumatism are rare.

As to *Aural Complications,*—Omitting facial neuritis, which may or may not be due to an ear condition, we have as the aural complications of gout and rheumatism the following list, which I put down in what seems to me to be their relative frequency: Neuralgias about the ear, itching of the canal, eczemas and urticaria, gouty deposits in the cartilagenous concha and canal, alteration of cerumen, tinnitus, chronic ill-defined obstructive deafness, and acute exudative catarrh. I am conscious that a number of conditions have been omitted that will be found mentioned in the literature; thus Harvey[1] lays stress upon destructive changes and upon exfoliation of bone in the temporal and mastoid regions. I have only seen caries in one case with a rheumatic diathesis, and have never seen bony excrescences. S. O. Richey[2] mentions a progressive deafness in anthritis deformans. This he ascribes to nervous exhaustion and to aural atrophy of probably a neuritic origin in the spinal system. In numerous severe cases of arthritis deformans I have never seen any ear symptoms. Alexander gives no place to rheumatic or gouty complications in his text book, nor does Sir Alexander Haig mention aural complication in his classic on uric acid. Haig merely

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blood pressure in collemic states. (The latter is obviously bulbar, as it is accompanied by occasional amnesias, migraines, and is followed by polyurea.)

Taking up the list of symptoms that I have personally met allow me to expand on each. Neuralgia about the ear,—this is particularly important as the patient at times ascribes it solely to some ear trouble, so nearly and so intimately is the pain associated. Two things will give the clue to the cause: first, the previous history of rheumatic or neuritic symptoms; second, muscle soreness and stiffness in the neck. As to the previous history one usually finds evidences of the versatility of the diathesis; one year the patient may have had muscular rheumatism, at another time a definite neuritis, or still again a gouty type of arthritis with thickening deposits and limitation of motion. The second consideration, muscle soreness in the leaders of the neck, has one feature that I have occasionally noticed and which I have not seen mentioned elsewhere. This is the presence of tender swellings, nodular in character, along the course of the muscles. It is an actual swelling of the muscle itself. Muscle spasticity exists to a greater or less degree and may be so pronounced as to produce a wry neck. I have had recently a case that had combined with this symptom a neuralgia progressing to a neuritis and a facial palsy of two months' duration. Here was a case in which the pain was so evidently in the ear that the patient was referred to me for examination of the ear. Yet the drum was normal, and the hearing and vestibular tests were normal. This was a case of herpetic.

Second in frequency and relatively common is itching of the canal. It is usually a "tearing," unbearable itch that tempts the patient to scratch the canal with a match or hairpin, and when seen this case usually shows the evidence of the scratching. There may be the reflex cough with it. Examination and probe-palpation show that the area involved is the floor of the canal, and the sensitive spot is often sharply defined. The cause is obviously the deposit of crystals in the skin.

Next chronic aural eczemas of all grades and all varieties, except the sebaceous type, can be met with in rheumatic cases. They may be brany, exfoliative, serous, papillary, bullous, hemorrhagic or pustular. The itching may or may not be severe, but surely as the more serious grades are met, there is marked pain on manipulating the auricle. Urticaria of a true or false type may be seen, and it is mentioned here on account of its frequent association with a neuritis or rheumatic background. I have seen two severe cases this

winter, both with bullae in the canal, but not on the drum. In each case pain was predominant and diagnosis was easy on account of the presence of blebs along the distribution of the great auricular nerve. The drums in each case were normal.

George W. MacKenzie[8] emphasizes the fact the neuritis is apt to radiate its pain throughout the other nerves, the 5th, 7th, and 8th being a common combination, and the condition often being mistaken for middle ear suppuration. He warns against the great danger of incising the infected blebs on the drum in those herpetic cases appearing during influenzal epidemics. The bacteria previously only on the dermal side of the drum may be by perforation introduced into the middle ear. It is a good principle to look for neuritis when one sees blebs.

Alteration of cerumen giving a clean ear, free from wax, is so frequently noticed as to cause a little curiosity. The tendency toward sweating is well known with rheumatic individuals, and this perspiration has little of the oily or sebaceous in it. In the ear canal the wax certainly seems to be diminished.

Tinnitus has been met in more cases with rheumatic diathesis than can be accounted for on the grounds of coincidence. Haig explains it by an increased blood pressure due to the uric acid in the system. But this is evidently not the explanation, as we find cases with no tinnitus and high blood pressure, or find tinnitus with high or low blood pressure. Many theories are rational, but they may not work out.

Gouty deposits in the cartilagenous or fibrous parts of the concha and canal have been seen by all aurists. The ear often escapes such deposits even in severe cases. As to what seem to be calcarious deposits in or behind the drum, these are more often organized plastic exudates, the remaining evidence of some former catarrh. There is occasionally seen, however, minute creamy-white concretions in the drum that are unmistakably calcarious. They may be oval or round, are apparently dense, seem to stand out elevated, and have a strong creamy color. One case of gout had huge deposits in the usual locations, fingers and toes; these broke down and exuded a thick, whitish paste. At the same time a large concretion deposited in the lobule and likewise broke down.

Chronic ill-defined obstructive deafness is seen quite often in the case with a rheumatic rather than a neuritic diathesis. This deafness comes on gradually, very gradually unless accelerated or complicated by acute catarrh. A number of causes may be advanced to explain the condition,—progressive ankylosis of the ossicles, and

ankylosis of the foot plate in the oval window are the most plausible. Yet it is possible that changes in the two intrinsic muscles of the middle ear, or even a general degradation in tissue tone may affect the acoustic function. Obviously progressive obstructive deafness has so many causes, that in a long standing case it is difficult to determine the comparative culpability of each.

Acute serous or exudative catarrh can surely be ascribed at times to acute rheumatic attacks, particularly where there is a tendency to inflammatory reaction. It is often seen when local irritation in the canal has been severe, as in the eczemas or urticarias. More rarely a severe neuritis may provoke a serous exudative reaction in the middle ear. Sexton[3 4] reports that serous otitis media is found nearly in subjects exhibiting a well pronounced rheumatic or gouty diathesis. He discovers no particular incidence in reference to the age of his patients. He further notes cases of drum congestion, some deafness and a stuffiness in the ear, pain, however, being absent.[5] I have never seen such acute congestive states that clearly ascribed to this diathesis.

The foregoing ear complications are of course only very occasional in rheumatic cases, yet they are mentioned to show the possibilities of their appearance. I have made a number of bad blunders in regarding these ear conditions as purely local.

The throat conditions exhibited by rheumatic patients are also not numerous, though they are more frequently met with than the ear conditions. There are mentioned by some authorities rheumatic pharyngitis and gouty sore throat, and most observers describe the two conditions separately. Rheumatic pharyngitis has features quite distinct from other forms of sore throat, and the one appearance that, to my observation, has been most constant is a "lateral" pharyngitis. This can be more fully described as a mucosal swelling on the lateral folds of the naso- and oro-pharynx. That the reaction is in the mucosa rather than in adenoid tissue is evident by its appearance when there is little pharyngeal adenoid present. This swelling is a mild inflammation or a subacute congestion and shows two distinct redish bands on the lateral walls, the rest of the mucosa is usually less chronically congested, but nevertheless has a bluish red color that spreads out to the fauces and soft palate. Two other characteristic features of the condition are the absence of catarrhal secretion and the relatively disproportionate amount of pain. The patients complain of actual pain, not soreness nor rawness in the throat; and the swelling, though not usually marked, is usually noticed by them. Trousseau[6] mentions the rapidity with

which this painful affection appears and its equally sudden disappearance "as if by magic"—this has often been noted, and it may not depend altogether upon any local or general treatment. It should be remembered that the rheumatic sore throat may appear "out of a clear sky" unaccompanied by any general rheumatic symptoms at the time. The history of attacks is, however, quite positive and an attack of rheumatism may shortly follow. Invariably the urine will be found high in acidity, running up to four or six times the normal, unless the patient has had some alkaline treatment.

To return to the sore throat, Fletcher Ingalls[7] has mentioned that recurrences are common and may go on to a chronic form of sore throat. I have noticed this in several cases. One presumes that there is in these cases muscle spasm in the intrinsic muscles of the pharynx, the constrictors and the palatals; for it is frequent to find the patients indifferent to carefully moulding their gutterals. One case willfully, so relaxed the palate as to give a voice of complete palate paralysis; this, she explained, she did so as to relieve the muscle spasm. Very occasionaly the muscle soreness spreads to the more extrinsic muscles of the neck, producing tenderness on palpation. I have never seen wry-neck develop from purely a rheumatic sore throat, yet it is of course on its own part a common manifestation of rheumatism.

So-called gouty sore throat is the final complication to be considered. Its existence is denied by many; others identify it by a variety of descriptions that, taken conglomerately, give a picture of intense hyperemia even to the point of an edema of the soft palate and uvula. As in the previous condition, pain is a most common symptom. Though Morrell MacKenzie said that "Gout is the last resort of destitute diagnosticians," he believed that gout could alone explain some obscure cases that he had met in the course of a long experience.[9] Harrison Allen[10] and Beverly Robinson[11] thought it rather frequent in its appearance.

It seems to me that the throat congestion seen in the gouty cases is identical with that in all the rheumatic types,—congestion of the lateral folds of the pharynx spreading on to the fauces and soft palate. Again pain is out of proportion to the symptoms. Certainly it is true that any of the nose or throat conditions can attack the rheumatic or gouty patient without having anything to do with these diatheses, yet the response to therapeutic measures alone will convince one that there is a true rheumatic or gouty sore throat. It is a condition remarkably responsive to treatment and will clear up long before the other more general symptoms disappear. Its re-

peated recurrence in subsequent attacks will help to confirm this belief.

In conclusion, I would like to make a plea for careful clinical observance of the mucosa of the tract we are studying. Though the era of mechanics that we are passing through has brought us much in methods of success, particularly toward correcting anatomical defects or variations,—we have drifted far away from the older principles of careful observation. We are chiefly dealing with a highly organized, highly sensitive, living tissue reacting most sensitively to general conditions, showing changes in nutrition, responses to irritations, to atmospheric conditions of temperature and moisture, and to a thousand and one imponderable subtile influences. We may believe that we begin to deal in intangible generalities when we consider these effects; surely if we are not sufficiently observant we will miss seeing them altogether. Their very subtleness makes it difficult to value them; but the more we look for them the more often we will find them and discover that their correction is a big factor toward results.

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FURTHER OBSERVATIONS ON THE BLOOD-CLOT DRESSING IN MASTOIDECTOMY.*

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History: The history of the "organized blood-clot" in the treatment of wounds dates from the researches of John Hunter.[1] Ere the advent of antisepsis, initiated by the researches of Pasteur and Lister, Hunter's unerring discernment and uncanny subtlety in observing *nature's laws* revealed to him the healing virtue possessed by the blood. However, it was not until the antiseptic principle was firmly established that the physiological principle of the "organized blood-clot," discovered by Hunter, was made practical use of as a means of primary healing. Schede of Hamburg gained credit for having established and popularized this method, having published his reports in 1886; however, Morris[2] of New York claims precedence of two years, but lost the honor, as he failed to publish his observations and experiments—at the time made. Later this technic was made wide use of by many leading American general surgeons, notably Halsted,[3] whose published reports, entitled "The Treatment of Wounds With Special Reference to the Value of the Blood-clot in the Management of Dead Spaces," are classic.

The history and development of the blood-clot dressing and technic, following mastoidectomy, may be credited, I believe, entirely, or for the most part, to American otologists. This history, I fancy, is familiar to you all, therefore I will not review it in detail, but simply refer you to the published reports of Blake of Boston, Reik of Baltimore and New York, Holmes of Cincinnati, Wheelock of Fort Wayne, Bryant of New York, Coats of Philadelphia, several contributions of the author,[4] and those of many other American aural surgeons.

A review of the literature on the subject, while indicating an increasing popularity in America of the blood-clot dressing with various modifications, following mastoidectomy, fail to indicate its adoption to any, or but little, extent in the British Isles or on the Continent. The employment of the Carrel-Dakin solution, following mastoidectomy, seems to be more popular in Europe than the blood-clot dressing, particularly by the French, but I may add that it has its advocates in America also. And when we consider the great advantages offered by both these methods, but especially the blood-clot method, the query naturally obtrudes itself as to why the latter

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has found little favor here and is not more generally practiced in America, where it was popularized, for it affords a very large percentage of successes, and when successful the result is *ideal.*

Technic: The object and theory of the blood-clot technic is to secure primary union of the mastoid wound—and to accomplish this without discomfort, without deformity and with safety to the patient—the last being of first importance.

The method as originally carried out by Blake and Reik, and still earnestly advocated by the latter, consists in complete exenteration of every particle of infected bone, granulation or other diseased tissue, observing strict asepsis, but without further efforts at chemical sterilization of the wound cavity, then to admit the clot and completely close the wound without provision for drainage. With this procedure Reik reports seventy-five per cent of primary healings in simple mastoidectomies. He is convinced that the failures to secure primary union and the incidence of dangerous complications, as sinus thromboses etc., are due, for the most part, to the lack of surgical skill of those who attempt the so-called blood-clot method to *mechanically* remove every particle of infected or diseased tissue, and carelessness or indifference in their asepsis. It may be conceded, in some instances, incompetence may be responsible for failure to secure primary union and also account for serious complications, but I take issue with the view that such ill results are generally due to the causes above described. I rather agree with Halsted's[5] views, cited by the author in a former paper,[4] that in operations for tuberculosis of the bones and joints and operations for bone abscesses "It is impossible to determine with the naked eye the limits of the disease. Of this fact anyone who carefully controls his operative work with the microscope may convince himself. I believe it is an accident of rare occurrence for a surgeon to extirpate absolutely every particle of the tubercular tissue," etc.

Halsted's views apply to abscesses in the mastoid and coincide with my argument, that it is absolutely impossible to mechanically remove every particle of infection from bone abscesses or from suppurating wounds of the soft parts. But notwithstanding it is impossible to attain complete mechanical disinfection of the mastoid, I am aware of the fact that the bactincidal properties of the blood may in many instances take care of a few microscopic foci of pyogenic micro-organisms and the wound heal primarily. Not all cases are so fortunate. Therefore, in my effort to increase the percentage of successes of primary union by the blood-clot method, and to obviate the incidence of dangerous complications as sinus thrombosis, brain abscess and meningitis, I have been prompted to make

a modification of the original method by adding chemical sterilization of the wound cavity with three per cent iodin solution and by providing temporary drainage, for a limited period, to relieve *tension*. I am convinced chemical sterilization to complete disinfection, and temporary drainage to relieve tension, in no way interfere with the perfect organization of the blood-clot or primary healing, but on the contrary add to the efficiency and safety of the blood-clot technic.

"In very mild cases, or 'ripe' cases of three weeks or longer duration, afer sterilizing with three per cent iodin solution and wiping the wound dry with sterile gauze, keeping it free of all watery solutions, as I have brought myself to do of late, I now admit the clot at once and close the wound completely, but provide for drainage by simply inserting between the stitches a loop of twisted silk worm gut, which is removed the following day. Through and through silk worm gut sutures are used and, as a rule, removed on the third day, being painted with three per cent iodin before removal. Dry outer dressings are preferred and are changed daily.

"In fulminating cases, or those of short duration, I vary my technic and the above sterilization is supplemented by a light iodoform gauze packing to provide for drainage and to perfect the sterilization before admitting the blood-clot. Then the wound is completely closed with the exception of a narrow opening at or near the lower end of the skin incision for the protrusion of the drainage strip of gauze packing. In twenty-four hours this gauze is withdrawn and, when the bleeding occasioned by this process fills the wound cavity, the small opening may be closed with adhesive plaster or the wound allowed to close of its own accord, or further drainage may be provided, if thought necessary, by inserting at this point a small loop of silk worm gut.

"To prevent infection of the clot from the direction of the middle ear free incision is made in the drum and the tympanic cavity flushed from the aditus with three per cent iodin and warm alcohol. Drainage is encouraged through the external auditory canal with a dry sterile gauze strip or cotton wick, or the same saturated with ten per cent carbolic-glycerin solution.

"With the modifications above proposed, providing for sterilization and drainage, the blood-clot operation is not contraindicated in subperiostal, extradural or even perisinal abscess involvement; nor in cases of poor physical condition and unfavorable environment, thus materially extending its scope and field of usefulness. Moreover, serious complications are minimized, which should encourage those to employ the method who hitherto have been deterred by the fear of such possibilities." [5]

I am convinced that fear, and fear alone, has prevented the routine adoption of the blood-clot method, that fear is the Chinese wall that makes the average surgeon afraid of himself, dreading the dragon that may be lurking just over the wall—in other words, the complications of meningitis, brain abscess, sinus thrombosis, etc.

My technic in radical mastoidectomy is the same as that advocated in previous discussions.[4] After thorough exenteration and sterilization of the wound, including the tympanum and canal, the posterior wound is closed completely. In selected cases the clot is introduced at once—but otherwise the cavity is packed with iodoform gauze for twenty-four hours before the clot is admitted.

Results and advantages. In simple mastoidectomies the above technic affords painless primary healing without deformity in about eighty-five per cent of all cases, the average time of healing being five to ten days, which I believe is better than is obtained by any other method—not excepting the Carrel-Dakin method, which is difficult of application save in a well-appointed hospital. Of course the antiquated packing method, with all its disadvantages of extreme pain at every dressing, the long period of healing—six to twelve weeks—and the marked deformity attending its application, compares in no way favorably with the blood-clot method. And even the method of the primary closure of the retro-auricular wound, leaving a simple drain in the antrum, without admitting the blood-clot, which is practiced extensively by a number of American otologists, and also by a few European aural surgeons, notably Moure of Bordeaux; while it gives good results in many instances and without marked deformity, yet the period of healing is two to four weeks—not nearly so favorable as the ideal results following the blood-clot method—which are accomplished without pain, discomfort or deformity, with the least trouble of application, and in the almost incredible period of healing time of five to ten days in a very large majority of cases.

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THE SURGICAL CONTROL OF BLEEDING FOLLOWING TONSILLECTOMY.

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For the past five or six years we have felt that the sending of patients from the operating table, following tonsillectomy, with oozing or a profuse hemorrhage as a post-operative possibility, was a crude and very unsatisfactory way to treat patients who have put their lives in our hands. While most bleeding will check spontaneously, a needless loss of blood takes place during the operation and afterwards, so why do a tonsillectomy and, as Coakley says, trust to luck?[1] A little more than three years ago, after seeing Lee Cohen of Baltimore ligate the tonsillar vessels, we decided that this procedure was the most surgical and one that was due the patient.

From October 1, 1919, to August 20, 1922, we have operated 978 patients, more than 700 being private cases. Ligation was used as a routine procedure in the majority of cases and I think our results justify our work.

The following table gives the age and sex of our patients:

Age	Male	Female
1- 5	64	53
5-10	161	151
10-15	93	82
15-20	37	56
20-30	46	116
30-40	33	46
40-50	7	19
50-60	2	11
60-70	1	0
Total	444	534

Total number of cases, 978.

All these cases were given general anesthesia.

Post-operative hemorrhage should not be more common in tonsillectomy than in any other operation done by a trained and careful surgeon. In our cases, during the operation, the most blood was lost by young and healthy males from eighteen to thirty-five. The least amount of blood was lost by women from thirty to sixty, especially if slender. The hardest cases to operate were patients with

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thick necks and thick tongues. They do not lose any more blood at the operation than the others, but are more difficult to ligate. Adults do not lose more blood than children in proportion to the blood volume.

Taking the coagulation time of the blood and the giving of calcium lactate has been found by us to be of no especial value. Clinic or dispensary patients bleed more during the operation than private patients. While it would be most unfortunate to operate upon a true hemophiliac, nevertheless, if most of the cases that are spoken of as such had the tonsillar vessels ligated, the term bleeder would pass into oblivion in tonsil surgery.

Of all our cases only one, a young woman, age 23, a sister of a physician, showed signs of being what is commonly called a bleeder. This patient told us before the operation that the least pin prick would cause her to bleed for a long period. She had frequent attacks of quinsy and rheumatism and an operation was necessary. After the removal of the right tonsil there was no profuse hemorrhage, but instead a general ooze from the entire tonsillar fossa that pressure had no effect on. It was necessary to put in thirteen ligatures in the right tonsillar fossa and nine in the left. The patient had no bleeding, not the slightest ooze after leaving the table. While others of our patients bled more upon the removal of a tonsil, this was the only one that wept from every portion of the tonsillar fossa, and still I hesitate to call her a hemophiliac because after the fossae were made snug by means of the ligatures there was no bleeding.

While some writers speak of the lower pole as being the point of greatest hemorrhage, this has not been our experience.

After the tonsil is removed the most severe point of hemorrhage is in the upper part of the tonsillar fossa. At first glance it appears just beyond the uvula, but it is high up and deep-seated in the muscle of the supra-tonsillar fossa. Without the assistance of a pillar retractor one cannot find as a rule the point of bleeding. In fact, we feel the pillar retractor is one of the most important instruments in tonsillectomy, for without it one could send a patient from the table with an apparently dry throat, whereas if the pillars were retracted a trickle of blood would be found running down into the sinus pyroformis. In order to secure this vessel in the supra-tonsillar fossa it is necessary to take a generous bite of the tissue to enclose the vessel within the ligature. Sometimes one ligature will not entirely check this bleeding and more ligatures will be necessary. One must always examine the supra-tonsillar fossa carefully, for many times bleeding that apparently comes from the lower pole

really comes from here, so it is necessary to secure this vessel first and examine the rest of the fossa afterwards. Oozing from the vessel just inside the posterior pillar midway between the upper and lower poles is generally found. As the tonsil strips off easiest here and the fossa is seen to be smooth, it is rare that one finds it necessary to ligate here, for this vessel is the one that checks the most promptly of all the cut vessels. Almost opposite this, on the posterior wall of the tonsillar fossa, is another vessel that we ligate very often. Pressure generally causes it to stop bleeding. From a recent experience we have had, we think it best to ligate here as a routine procedure.

The patient was a clergyman, age 43, with high blood pressure. After the removal of the right tonsil brisk bleeding followed in the upper pole, the rest of the fossa almost dry. The vessel in the upper tonsillar fossa was ligated, also the vessel on the lateral wall. The left tonsil was now removed and in a few minutes, with pressure, the oozing in the upper pole and on the lateral wall ceased, so we felt it was not necessary to ligate. One hour later we were notified that the patient was bleeding. A trickle of blood was coming from his nose and every few minutes he was expectorating blood. We tried pressure in the left tonsillar fossa without avail and after examining the fossa could find no definite point of bleeding. The interne and I decided it must be from the naso-pharynx, as we had removed a very large adenoid from this patient. This oozing kept up, on and off, for a good part of the afternoon and the removal of a clot in the left tonsillar fossa failed to stop this slow oozing and, while the patient was not losing a great amount of blood, it was becoming uncomfortable for both of us. He was sent to the operating room, given an anesthetic, and with a pillar retractor an examination of both fossae was made. The ligatures in the right fossa were intact and the cavity dry. On the lateral wall of the left fossa there was a tiny clot and when this was removed a constant slow ooze was seen coming from the vessel on the lateral wall. A ligature was put on this vessel within a few seconds and that was the end of the hemorrhage. This type of post-operative hemorrhage is, we believe, a very dangerous one, as pressure had no influence whatsoever, and it leads one to think that in tonsillectomy with every cut vessel looms potential post-operative hemorrhage.

If we had ligated the vessels in the left tonsillar fossa in this case as a routine procedure, regardless of the prompt cessation of hemorrhage after the removal of the tonsil, we would not have had the anxiety of a post-operative oozing and would have spared the patient and ourselves.

We have not found it necessary to ligate the vessel or vessels, as it may be, in the lower tonsillar fossa near the tongue as often as in the upper pole. One rule must be borne in mind, however. If bleeding in the lower pole does not check promptly, with pressure, then ligate, for this place is apt to be the seat of persistent, dangerous hemorrhage, as the following case will illustrate:

The patient was a boy of fourteen, son of a physician. He gave a history of several attacks of tonsillitis, followed by attacks of rheumatism which kept him in bed for several weeks at a time. Mitral regurgitation resulted from his rheumatism. He was very

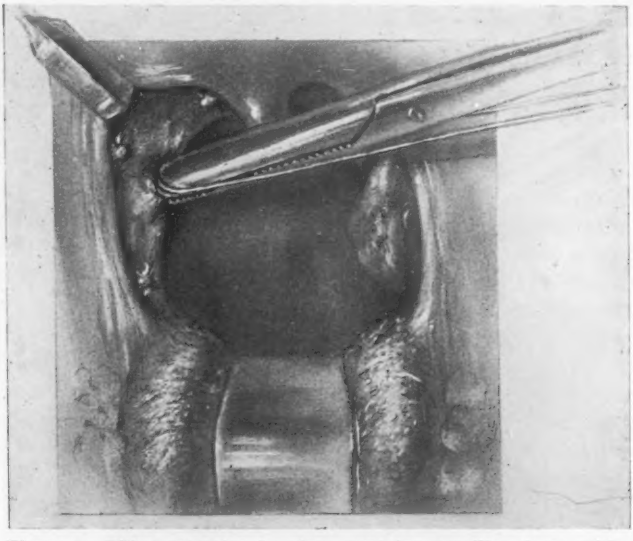

Figure 1. Pillar retractor in place exposing tonsillar fossa with the three principal vessels tied and preliminary step of tying the fourth vessel by the Jackson hemostat.

pale and quite thin and altogether not a very promising subject for operation.

After the removal of the right tonsil, ligatures controlling the bleeding in the upper tonsillar fossa, bleeding still persisted in the lower fossa. However, with four or five minutes' pressure this checked. After the removal of the left tonsil all bleeding was promptly checked by ligatures in the upper fossa. Four hours after the operation we were called to the hospital because of the patient vomiting considerable blood. A clot was removed from the lower right tonsillar fossa and bleeding was apparently checked. Two

hours later we were again called to see the patient and after removing another clot pressure for three or four minutes was applied by means of a gauze sponge dipped in adrenalin, after which no bleeding took place. Considering the condition of this boy before the operation, if bleeding had kept up for several hours more, the boy would have been in a dangerous condition. We should, in this case, instead of relying upon pressure, have ligated the vessels in the lower pole at the time of operation.

In recent years we have preferred general anesthesia to local in all cases, including adults. Eight or nine years ago we were very

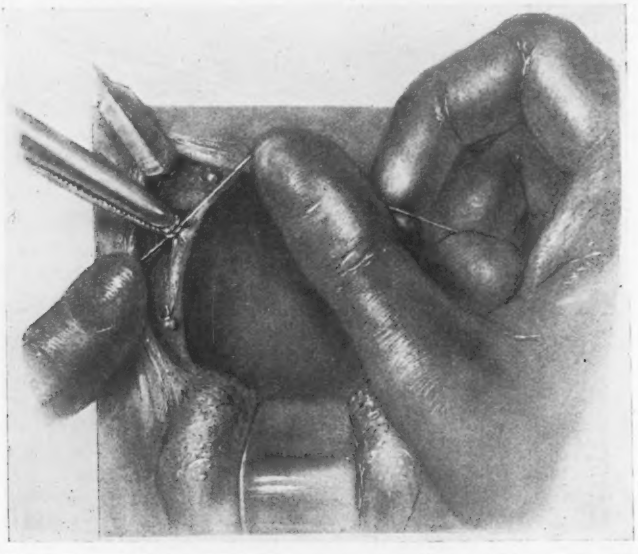

Figure 2. Final step of tying the vessel near the posterior pillar, showing position of fingers in completing the ligature.

enthusiastic over local anesthesia, but time has chilled our enthusiasm. Local anesthesia is our choice for all operations in the nose, pharynx and larynx excepting tonsillectomy and adenoidectomy.

Under general anesthesia the patient is under absolute control, especially if a severe hemorrhage occurs during the operation. The vessels can be ligated as is done in any part of the body, and following the operation there is not the frightful nervous shock that one sees so frequently in patients done under local anesthesia, incapacitating them for months. Danger of death from cocain is avoided

and with good, careful work I believe the danger of lung abscess is lessened, as this happens more frequently with local anesthesia than was formerly supposed.[2] As a rule, with local anesthesia there is very little bleeding at the time of the operation, but post-operative hemorrhage is more apt to occur than with general anesthesia.[3] In fact, our office histories of cases operated elsewhere prove that post-operative hemorrhage is very common following local anesthesia and patients who had anticipated a day or so in the hospital, because of hemorrhage and shock were incapacitated for weeks or months. Also one out of every four adults has adenoids, either large or small, and under general anesthesia these can be thoroughly removed.

Our method of operating is as follows: Fifteen minutes before beginning the anesthetic, atropine is given according to age. Ether, by the drop method, can be relied upon as being the safest method of anesthesia in tonsillectomy and adenoidectomy. The patient lies in a horizontal position and a sand bag is placed under the neck and shoulders with the head extended. When the patient is relaxed a Whitehead mouth gag is introduced. The assistant depresses the tongue with a spatula and the tonsil seized by a Halle tenaculum and pulled out of its bed. An incision is made in the mucous membrane above the upper pole by a curved blunt scissors down to the capsule and continued half way down along the anterior pillar and the same way along the posterior pillar. The points of the scissors are then closed and the tonsil bluntly dissected for two-thirds of its attachment in the fossa. A Tyding snare is used and the wire run down over the tenaculum and slowly closed, completing the dissection. A rounded firm gauze sponge, large enough to completely fill the tonsillar fossa, is immediately introduced by the assistant. The sponge is held firmly in the tonsillar fossa and no blood escapes, except in unusual cases. It is removed in a few minutes and a pillar retractor in the hands of the assistant exposes the tonsillar fossa. The most severe point of bleeding is noted, generally in the supra-tonsillar fossa, and one or more ligatures are placed here. Then the entire tonsillar fossa is carefully examined for bleeding points. These are picked up in turn and ligated. If there is bleeding in the rest of the fossa before the clamp in the upper fossa is removed, a smaller sponge in the bottom of the fossa controls all bleeding until the upper ligature is in place. The loss of very little blood is due to the assistant, who with one hand depresses the tongue and with the other sponges with judgment and skill. The suction apparatus is never used by us, as we believe that with our technic it would be of no benefit.

For securing the vessels a notched modification of the Jackson hemostat, made by Mueller, is used. No. 1 plain catgut, about fourteen inches long, is run over the notch and secured on the handle of the other side. A generous bite of tissue is taken, after which the assistant holds the hemostat. The operator loosens up the two secured strands and makes a single loop and slips it loosely down to the tip of the forceps with the index finger of the left hand and traction made on the other part of the strand by the right hand as low as possible along the outside of the jaw. As the loop becomes smaller and nears the tip of the forceps, the assistant gradually brings the forceps to his side and as the knot is being tied, releases the clamp. Ligation is then completed by the triple knot. The different vessels are picked up and tied in the same way.

In rare instances it is necessary to use plain artery forceps when the blunt forceps cannot pick up the bleeding vessel. With the tissue lifted up it is then a simple matter to get a grasp with the Jackson clamp.

To put a tie in the lower tonsillar fossa it is best to stand at the head of the table, and working in deep throats, we have found it easier to place a tie in a difficult spot by standing on a bench, being well above the patient. The throat now being dry, the adenoid is removed and with the checking of this bleeding the patient is returned to bed to lie with the head to one side. If the vessels have been properly secured, very little blood, certainly no fresh blood, will be found in the vomitus.

All patients remain in bed until the end of the third day, then return home and are advised to stay in bed at least two days. Adults are encouraged to remain in the hospital at least a week. No patient has recovered from the tonsil operation until the sloughing membrane has entirely disappeared from the throat.

In three or four of our cases, five or six days after the operation, laughing heartily or screaming from a sudden fright prematurely loosened a piece of membrane and opened a thrombosed vessel and bleeding to the extent of a mouthful or two of blood occurred. This happened to several of our cases before we ligated as a routine, so ligation cannot be considered a factor here.

The two cases of post-operative hemorrhage that we have described in detail and a child that bled from the adenoid were the only cases we were called to see following the operation. The child had bled for a few minutes from the nose before we were called and twenty minutes later when we reached the hospital it had stopped. Three other cases of post-operative hemorrhage in children that

began six hours after the operation were taken care of by the interne by wiping away a clot and using pressure. The bleeding was so slight that we did not hear of it until the next day.

A great advantage of tying the tonsillar vessels is that after the removal of the first tonsil, one can work on the other tonsil in a perfectly dry field. Every operator has had the experience that after the first tonsillar fossa is apparently dry by pressure and being in the midst of dissection of the second tonsil to find the field covered with blood, due to the vessels suddenly opening up in the first tonsillar fossa. This does not happen when one uses ligatures.

Some contend that ligation of the vessels results in a very sore throat. In a number of cases we operated, in which only one side was ligated, the patients complained of more pain on the non-ligated side.

Others hold that the ligatures remain in place such a short time that the hemostatic value is from the primary crushing of the vessel by the forceps. We find that the ligatures remain in place from one to five days and we feel that their presence over this period controls the process of thrombosis.

Conclusion: *All bleeding vessels should be ligated primarily,* instead of trying various non-surgical methods of hemostasis, such as pressure, suturing of pillars and compression of vessels by means of a clamp and, what is the most common practice, to disregard the bleeding entirely; methods no longer tolerated by the general surgeon.

With practice, by the technic described, the tying of the tonsillar vessels is a simple procedure for the experienced operator.

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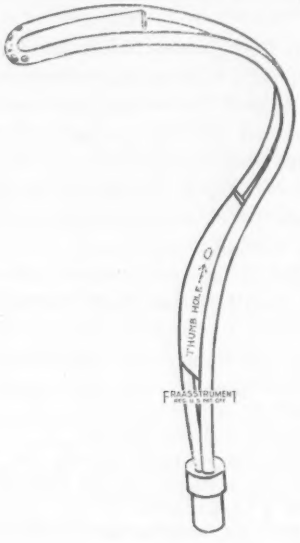
104 2nd Street.

A NEW SUCTION TONGUE DEPRESSOR.

Dr. Westley M. Hunt, New York.

This instrument is designed for use during tonsillectomy and is an improvement of the Titus Suction Tongue Depressor now on the market. The improvements and advantages are a curve on the tongue portion which lifts the tongue forward instead of pressing it back into the pharynx; and a make and break control of the suc-



tion by using the thumb hole shown in the cut. The ability to make and break the suction at will is a very great advantage in operating, as will be readily seen, and the usual complaint that the anesthetic being administered is taken up by the suction apparatus is eliminated. The thumb hole is so sized as to allow 15 inches of vacuum to be used without causing suction at the distal end.

33 East 68th Street.

*From the Laryngological Service, St. Luke's Hospital, New York. Dr. Antonie P. Voislawsky, Director.

*Accepted Jan. 20, 1923 for publication in The Laryngoscope.

A NEW PHARYNGEAL SUCTION TUBE.

Dr. M. C. Myerson, Brooklyn, N. Y.

The writer offers to the profession a new tonsillectomy suction tube which seems a decided improvement upon all other tubes at present in use. This tube has one advantage in particular. Its design and dimensions are such that it can be employed constantly throughout the entire procedure of tonsillectomy and adenoidectomy, and its presence in the throat does not interfere with the operator.

The writer recently completed a study of one hundred consecutive tonsillectomies under general anesthesia in which the tracheo-bronchial content was observed, and the factors in the operation influencing this content carefully noted. In this work it was demonstrated that one of the chief difficulties in the prevention of blood from entering the tracheo-bronchial tree was the failure of the suction apparatus to withdraw the blood quickly enough. The ideal suction arrangement should be one which would withdraw the blood as quickly as it accumulates. If the blood accumulates faster than it is withdrawn, some of it gets into the tracheo-bronchial tree and a good deal of it reaches the stomach. The former is of course more serious, yet if both conditions could be prevented, the patient would no doubt show a better reaction and feel better after the operation.

The instrument here pictured obviates the necessity of withdrawal during the operative procedure. Its shaft is thin and flattened ovoid in shape; the distal end, which is about 18 mm. long, meets the shaft at an angle of approximately forty-five degrees. This distal end has three slits, one being the open end of the tube, while the other two are placed one on its upper and one on its lower surface. These slits are 1½ mm. wide and 6 mm. and 12 mm. long, the length of each slit corresponding with the width of the shaft of the instrument.

The instrument is made in two sizes, the 6 mm. width being used for very young patients, while the 12 mm. width is used for older children and adults. The smaller tube becomes obstructed infrequently in the presence of a very short coagulation time. The larger tube has not become obstructed in almost two hundred cases.

When used its distal end is rested flatly against the posterior pharyngeal wall and kept in the center or left side of the throat while the right tonsil is being removed. When the left tonsil is being removed the tube is either kept in the center of the posterior

*Accepted Jan. 29, 1923 for publication in The Laryngoscope.

pharyngeal wall, or is shifted to the right side. During the operation of adenoidectomy, while instruments are being used the tip of the suction tube is kept to one side or the other and away from the midline, preferably in a horizontal position. The size of these slits afford a greater resistance when combined with that of the lumen of the tube than that of the other tubes now in use. The suction effort for this reason seems to be greater. This tube rarely becomes blocked during operation. So far as can be ascertained through experimentation with every conceivable type of suction

tube, it seems virtually impossible to have a tube that will suck and at the same time never become clogged in tonsillectomy work. The slits are of such a length as to prevent a total blocking of them; a partial obstruction is negligible. If the distal end is blocked there are still the other two slits available for suction. This instrument

Because of these differences in design this tube most nearly fulfills the requisite of emptying the pharyngeal cavity of its blood content as fast as it accumulates. Therefore it helps in the elimination of one of the factors causing blood to enter the tracheo-bronchial tree during tonsillectomy under general anesthesia.

184 Clinton Street.

A TONSIL NEEDLE.

Dr. Lee M. Hurd, New York.

It is evident that the need for a perfect hemostasis after tonsillectomy is as great as it is in any wound, operative or accidental. Indeed, in view of the fact that a slow ooze from a cut vessel after tonsillectomy may not, for a considerable time, show itself by external signs, thus resembling a concealed hemorrhage within the tissues or into a body cavity, this need for hemostasis in the tonsil fossa is even more important than in some other wounds.

The best surgical method which is the surest and easiest of application in all cases, differs not at all from the method used elsewhere in the body, namely, the use of a ligature about the bleeding point

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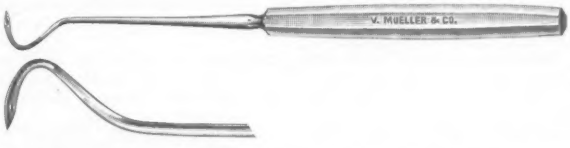
Inasmuch as the bleeding vessel lies within muscular tissue which moves actively with each effort at deglutition, phonation and expectoration, it is better to secure the bleeding point with a suture than with a simple ligature.

The tonsil needles described are for this purpose. They are made in pairs, left and right; the one which is curved from left to right is used in the right tonsil fossa, and the one with the opposite curve in the left fossa. The small eye which is near the point carries Number 0 size catgut which must be sufficiently long to come well out of the mouth at each end. The curve of the shaft of the needle is thus found to enable the operator to reach every part of the fossa, and pass the needle through the tissues from without inwards with the most ease. The handles are made large enough to be comfortably held without slipping.

Their mode of use is simple. The bleeding point is found by means of pillar retraction and careful sponging. preferably with



small, firm sponges. It is then caught with suitably curved hemostat of sufficient length to protrude from the mouth so that it can be managed by the operator. The suture is passed with the needle, the blade of which is flattened laterally, through the tissue just beyond the grasp of the hemostat. The part of the suture which has been pushed through the tissue can now be grasped as it lies along the needle, with the hemostat, which can be removed at this stage of the technic. The suture is thus secured at one end, and the other end is secured by the withdrawal of the needle from the fossa in reverse direction to which it was passed. The knot may be tied, if a slip knot is used, without the aid of anything more than the two forefingers. It is made secure by adding a second knot to make a square knot.

The chief points of interest in the tonsil needles are the placing of the needle eye, the flattening of the blade at right angles to the shaft, and the peculiar curve of the first portions of the shaft.

I have used these needles for twelve years with both general and local anesthesia with entire satisfaction.

39 East 50th St.

THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON RHINOLOGY AND LARYNGOLOGY.

(*Continued from page 399, May issue.*)

Diagnosis and Treatment of Paranasal Sinus Disease in Infants and Children. Dr. I. W. Dean, (Iowa City).

(*To appear in a subsequent issue of* THE LARYNGOSCOPE.)

DISCUSSION.

DR. COFFIN said he had for many years been interested in the sinusitis of children, and was delighted that Dr. Dean had taken up the study of such disease in so thorough, systematic, and persistent a way. Dr. Dean, he said, was unusually fortunate in his facilities for study, having at his call all the resources of a great university. The interesting and newer points of the evening's paper are the conclusive proof shown by Dr. Dean of the causative relation of an improper diet to the diseases of the accessory sinuses and the value of a proper diet as an essential element in treatment.

As to operative treatment, Dr. Coffin said he had not operated children intranasally for the elimination of ethmoiditis and antrum disease. He had, where recovery did not follow such procedures as removal of tonsils and adenoids, suction, irrigation, etc., done the radical operation through external incision.

DR. EMIL MAYER said that this presentation called to mind a time more than two decades ago when Dr. Coffin in the Manhattan, and the speaker in the New York Eye and Ear Infirmary treated children with accessory sinus disease and eventually reported the same.

It was not long thereafter when one of the German journals printed an article stating that there was no such thing as sinus disease in children, but that it was a tuberculosis or osteo-malacia.

Following this Dr. Pearce of Boston reported the results of an examination of the sinuses in 75 autopsies in diphtheritic cases and in every instance the bacillus of diphtheria was found. This established beyond any doubt that sinus disease does exist and infection is carried into the sinuses.

To Dr. Dean belongs the credit of careful study of chronic sinus disease in young children, and the thoroughness in which every detail has been gone into not only serves as a model for emulation but merits the highest praise for his close attention to every detail in the care of these little invalids.

DR. MCCULLAGH said that it was always a great pleasure and stimulus to hear Dr. Dean on his too rare visits here, and every one would agree with the efficacy of Dr. Dean's methods of treatment in these cases; he was conservative to the limit, and then employed radical measures when they were indicated. The object is to cure the cases; they can be carried along to a certain point with conservative treatment, but one must not be afraid to intervene with radical surgery when necessary to cure.

DR. E. ROSS FAULKNER: It is always a great pleasure to hear Dr. Dean. He always tells the truth, and always has some truth to tell. His paper tonight gave us a great deal of light on a class of cases which are more or less of a problem to us all.

I was particularly pleased to hear the evidence from Dr. Dean on the influence of diet in animals in predisposing to sinus trouble. Dr. Coffin has also emphasized this influence. I have always maintained that the only infection which ever receives intelligent general treatment is tuberculosis. In this condition we depend on rest, fresh air, and good food to effect a cure without any local treatment, but in locations where we are able to apply local treatment, we are apt to forget the importance of general treatment.

I would like to say a word about the manifestations of acute sinusitis in children. This presents a definite clinical picture with high temperature, which varies greatly according to the periods when drainage is active. Such cases, if there is at the same time involvement of the middle ear, are sometimes operated on for mastoid, or may even have a jugular tied, when the sphenoid is responsible for the phenomena. I have two acute sinus cases in children at present, one of which has a slight discharge from one ear, but most of the symptoms are due to the nasal sinusitis. The temperature goes to 104, or 105. The other case has no ear symptoms, but is running a similar course, and has a double optic neuritis, which for a few days looked very threatening to the sight. The sinusitis however is subsiding, and the eyes are clearing up. This case is the child of an oculist, hence the discovery of the optic neuritis, which may be a more frequent complication than we suppose.

DR. FORBES asked how much reliance Dr. Dean placed on the X-rays and how much it helped him in working out his sinus problems.

DR. DEAN replied that he used X-ray pictures in infants and young children; first, to determine whether or not a given sinus was present; and second, if present, whether or not it was of sufficient size to be of clinical significance. A blurred sinus at this age did not mean infection. A clear sinus was of significance in a negative sense. He felt that sinuses in infants and young children were apt to be precocious. He then told of a case of sphenoidal empyema in a child five years and three months of age who came into the hospital in a terminal stage of a systemic infection. At autopsy it was found that each sphenoid was an inch in diameter.

SECTION ON OTOLOGY.

February 9, 1923.

Double Mastoiditis, with no Symptoms, and Unexplained Temperature for Three Months. Dr. Wesley C. Bowers, New York City.

History: J. E., a boy aged five, had been running an unexplained temperature of between 99° and 103° for three months. At the beginning he had both ear drums opened, following which the temperature came down but remained between 99° and 100° for several weeks. The ears stopped discharging in a few days. The temperature again went to 103° and myringotomy, on both sides, was again performed by the family physician. The temperature gradually came down to 99° and stayed there for a number of week when it once again went to 103°. Both drums were again opened, the temperature returned to near normal and the discharge ceased in the course of a few days. Five weeks previous to the time I saw the boy, he had developed whooping-cough of a very severe form. When I saw him, three months after the onset of the temperature it had again gone to 103° for the previous two days.

Examination: The right drum showed nothing, except that the upper part looked full and stretched. There was practically no redness in any part of it; no mastoid tenderness. The left drum was normal except that it looked somewhat thick. X-ray showed both mastoids very cloudy.

Operation: The right mastoid was opened the following day and found to be filled with pus and granulations, all the cells being necrotic.

This day I again examined the left drum. During the previous twenty-four hours the drum had become lustreless and seemed full. There was no bulging or redness, landmarks were visible. I did a myringotomy on this side and obtained thick yellow pus. Because of the whooping-cough I delayed opening the left mastoid till several days later, when I found it to be in practically the same condition as the right one.

The temperature gradually came down to normal.

This case illustrates the importance of an X-ray in cases with an acute otitis which continues to have a temperature. It also illustrates the significance of recurring attacks of otitis. This boy's temperature never

reached 98.4° for three months; it was always between 99° and 100°. During this period the landmarks were visible, there was no redness of the membrane and no mastoid tenderness. When I saw him there was absolutely no evidence of mastoid involvement from the appearance of the drum except for the fact that the membrane looked thickened. This case also illustrates that you can have pus in the middle ear without redness or bulging of the drum; simply a full appearance of the drum and lack of lustre. It also shows the futility of repeated myringotomies.

Sinus Thrombosis, Facial Paralysis on Opposite Side, Double Choked Disc: Recovery. Dr. Wesley C. Bowers, New York City.

CASE 1. *History*: J. P., age 14, was admitted to Bellevue Hospital, New York City, on Nov. 4th, 1921, complaining of pain in and discharge from the right ear. One week before admission she had a sore throat, pain in the right ear and some temperature. The sore throat cleared up in two days but the pain in the ear persisted and three days later—four days previous to admission, discharge appeared and had persisted. The pain had been slight in the day time but severe at night. The patient gave a history of having had trouble with this ear about five times previously, the first time when a very small child. Each time the condition cleared up in three or four days and there was no discharge from the ear between attacks. An incision was once made, when she was very young, behind this ear for an abscess.

Physical Examination showed a well nourished Italian girl apparently only moderately ill. With the exception of the ear condition she was normal, physically, in evey way. Examination of the ear showed the meatus swollen and filled with purulent secretion. The swelling of the canal precluded a view of the drum. There was slight mastoid tenderness over the antrum and tip. A scar behind the ear about one inch long, extending from the tip of the mastoid upwards. This was apparently a Wilde incision. The temperature was 101°, pulse 104, respirations 20. Culture from the ear showed staphylococcus albus. The blood count was WBC 12,800; polys., 80%, lymph., 20%.

X-ray of the right mastoid showed a slight degree of peri-auricular sclerosis; there was no evidence of bone necrosis; the mastoid was of the diploic type.

For the two days following her admission to the hospital, her temperature remained around 101°. On the third day it went suddenly to 105.3°. The swelling of the canal wall had lessened so that the drum could be seen. The canal was foreshortened and filled with thick pus. The eyegrounds were negative; the lungs clear; no signs of meningeal or cranial nerve involvement were present; the skin showed no pectechia or rosespots; there was no joint involvement.

Operation: The following day the mastoid was opened. It was found to be entirely broken down and filled with pus and granulations. There was a large abscess cavity over the sinus. The sinus was exposed for a distance of one inch. The upper part of the sinus wall was thickened; the lower part obliterated; the wall was necrotic. Both ends were packed off, a free opening made in the wall and free bleeding obtained from both ends. The jugular was tied off above the facial.

Clinical Course: The night following the operation, the patient had a chill. In the course of the following three days the temperature gradually came down to normal. The patient appeared toxic, had some headache, was mentally obscured but not actively delirious. There was a slight positive Kernig. The blood culture taken before the operation was negative. The spinal fluid showed normal pressure, was clear with four cells to the cm.; culture, negative. After the third day post-op., the patient ran a slightly septic temperature between 98.4° and 102°, for six days following which it gradually came down to normal. On the 18th and 19th days, it was 97.2°; on the four succeeding days it ranged from 97.1° to 100°.

The following neurological note was made on the fourth day post-op.: "Cranial nerves normal; no evidence of cerebellar or cerebral abscess

or pachymeningitis; the only evidence of central nervous involvement is a weak clonus on the right and left, which is compatible with the toxic, irritative symptoms."

On the seventh day after operation the patient's right elbow became painful, reddened and considerably swollen. This condition cleared up in about seven days. Blood cultures taken during this period were negative. On the eighth day post-op., the blood culture was positive for staphylococcus albus. At this time she had four or five superficial abscesses on various parts of her body.

Fourteen days post-op., the entire left side of her face (the right mastoid was the one involved) became partially paralysed. There was a double choked disc; right 3 D, left 2 D. She had a spontaneous nystagmus in both directions, more marked to the left. She complained of some headache, otherwise there were no meningeal signs. She appeared markedly toxic, very much prostrated, had numerous abscesses and complained of abdominal pain.

One neurologist was so certain of a cere-bropontine-angle abscess on the left side that he advised exploration sixteen days post-op. Dr. Foster Kennedy's neurological examination, made five days after the first neurological examination and ten days after the development of the facial, was as follows:

"I am unable to decide about this case. The fundi have a high degree of exudate in lumps, outside the discs which are not completely obscured; an appearance more characteristic of toxic retinitis than of papillo-edema due to increased pressure. Kernig's sign is no more positive than is usual in mastoiditis with a local pachymeningitis. Nystagmus is present, coarser to the left than to the right. There is left facial weakness, quite incomplete, probably—though not certainly—peripheral. There is no fifth nerve palsy; neck not especially stiff; abdominal reflexes, left greater than right; other reflexes normal; clonus, negligible. No ataxia whatever. The likelihood of there being a frank pus tuous. On the surface of the disc and extending beyond its borders, are tioning perfectly but not as imperfectly as it should if it were the seat of an abscess as large as one would judge if the fundi condition were to be considered as due to increased pressure."

The examination of the eyes, two days later by Dr. Wolff, follows:

"Both eyes show a marked edematous swelling of discs with elevation of about 4 D. Edema extends for a considerable distance beyond the disc into the retina, so that the vessels shade off gradually to the lower level, instead of making a sharp bend around the swollen disc margins, as in the pure papillo-edema. The retinal vessels are very full and tortuous. On the surface of the disc, and extending beyond its borders, are numerous radially arranged glistening exudates. There are a few hemorrhages visible."

Spinal fluid at this time showed normal pressure, clear, with 5 cells to the cm.; culture, negative. The blood culture was also negative. The blood count taken twenty-two days post-op., gave WBC 15,600; polys., 66%, lymph., 33%, eos., 1%.

In the course of the next ten days, all symptoms disappeared, the facial paralysis entirely cleared up, the eye-grounds returned to normal. The patient was discharged from the hospital thirty-six days after operation entirely recovered in every way.

Case II. *History*: P. W., aged 19, was admitted to St. Luke's Hospital, New York City, on November 19th, 1921. Two weeks previous to admission the patient began to have severe pains running down the back of the neck and in the occipital region. These were constant and not relieved by anything. Two days later he began to feel feverish and acutely ill. One week before admission he started having chills—the temperature going to 106° on two occasions—lasting about half an hour and leaving him very exhausted. Pain appeared in the right ear, increased on movement of the body. A hacking cough developed and, on admission, a diagnosis of Broncho-pneumonia was made. The patient stated that for some years he had some pain and fullness, on and off,

in the right ear. Two years ago he developed an acute otitis media on the right side. At this time the drum was incised at St. Luke's and the otitis cleared up promptly. The canal had remained dry up to the present time.

Physical Examination showed an acutely ill patient, with a hacking cough; temperature, 104°; pulse, 104; respirations, 22. Eyes: negative. Ears: considerable mastoid tenderness on the right side, canal dry, drum perforated in lower posterior quadrant; remainder of drum thickened. Left ear, negative. Nervous system; negative. Other examinations; negative. Blood count WBC 20,000; polys., 74%, lymph., 26%. Blood culture was negative. Spinal fluid clear, under normal pressure; four cells to the cm.; lymph., 100%.

X-ray of the mastoids showed breaking down of the mastoid cells on the right side. The labyrinth re-acted normally to caloric and rotation. A moderate voice could be heard on the right side, one and a half feet (with the noise apparatus) and twenty-five feet on the left side. There was a Weber to the right. The upper limit was 22,802, right side; 29,802 on the left. The low limit was 220, right; 16, left.

These findings indicated an acute exacerbation of a chronic mastoid with the possibility of a sinus thrombosis. There was however, no history of discharge from the ear except for a short time following the acute attack of otitis media.

Operation: Operation disclosed a very large mastoid with the cells all necrotic and filled with granulations and pus. The sinus was far forward. There was a perisimus abscess. There was a large cholesteatoma in a cavity posterior to the antrum and in the middle ear. A large area of dura, in the middle fossa, had been exposed by disease and was covered with granulations. The sinus wall was very much thickened and because of the history of chills with sudden rise of temperature it was deemed best to open the sinus. Both ends were packed off and a free opening made in the sinus wall. Free bleeding was obtained from both ends. The jugular was tied off above the facial.

Clinical Course: The night following the operation the patient had two chills. The temperature came down to normal the following day and remained so. The pulse varied from 75 to 90.

As I was off service at this time, I did not see this case for twenty days after the operation. On the twentieth day post-op., I again examined him. At this time his right pupil was larger than his left and there seemed to be some weakness of the right rectus muscle. There was no nystagmus; the fundi showed the disc O D, 3D, O S, 4 ½D. The entire face on the left side (the right was the operated side) showed decided weakness. Questioning him, I learned that he had been unable to whistle for one week past (two weeks post-op.), he had had some headache off and on during this period, but not severe. The blood count at this time was WBC 9,600; polys., 63%, lymph., 37%. Spinal fluid was clear, four cells to the cm., lymph., 100%.

One week later, twenty-seven days after operation, the spinal fluid was negative for everything, including Wassermann. The eye-grounds showed O D, slight blurring; O S, 3D, and some retinal hemorrhage. The other symptoms remained the same and he had no headache. Six weeks post-operation there was no headache, the right pupil was still large, the left side of the face continued weak. The radical cavity had completely dermatised and was dry, with a small opening persisting behind, due to the fact that it was necessary to leave the incision open at the time of operation in order to remove the packing from the sinus.

Four months after operation, the facial paralysis had cleared up, the right pupil was still larger than the left, the fundi were clear. The boy felt and acted perfectly well.

Conclusions: It would seem that in these cases, the facial paralysis on the opposite was purely toxic in origin. The "choked disc" may have been toxic or may have been a true choked disc due to the sinus thrombosis. The fact that the choked disc and the facial did not appear until two weeks after the operation on the jugular and the fact that the condi-

tion cleared up so completely would seem to indicate that the whole condition was toxic. The first case cleared up in about three weeks; the second in about three months.

I have been unable to find in the literature, any record of facial paralysis occurring on the opposite side, following mastoidectomy, excepting those due to meningitis. I should be very glad to have the opinion of others as to the cause. Had the facial paralysis occurred on the same side as the mastoid, one certainly would have felt concerned about the cerebro pontine angle.

Chronic Otorrhea with Labyrinthine Irritation. Dr. A. N. Schiller.

Miss B., age twenty-three, was referred to me in September, 1922. Previous history is as follows: At the age of seven, had scarlet fever complicated with double purulent otitis media, which persisted up to 2½ years ago, and from that period up to the time of operation, the discharge from the right ear had been continuous, whereas that from the left ear varied—that is, at times the ear being dry while at others there being a slight moisture which would continue but for a short period.

Two and a half years ago the patient began to complain of attacks of headaches, dizziness, nausea and vomitting. These attacks would last about five minutes. The headaches were localized to the right frontal region. She felt herself falling forward and had to sieze some object to keep from falling. Some days she would have one attack while at other times she would have two attacks within twenty-four hours.

She sought the advice of the family physician, who told her that the condition was due to stomach and liver trouble. After one year these attacks ceased but the ottorrhea from the right ear persisted. After five months of freedom from such spells they began to recur. It was shortly after this that the patient consulted me.

Examination of the right ear was as follows: a foul purulent discharge, moderate in quantity was present. There was a large marginal perforation in the tympanic membrane; there was no mastoid tenderness, no odema. Examination of discharge showed mainly staphlococci. The left ear had a central perforation and was dry.

Weber localized to the right.

Rinne was negative in both ears.

Whispered voice was heard five feet in the right ear and eight feet in the left.

No spontaneous nystagmus was present. No Rhomberg.

Past pointing was normal. Finger to finger and finger to nose.

Caloric test in both positions showed normal functioning labyrinth.

X-ray of mastoids showed a moderate amount of sclerosis in both mastoids with an apparent exposure of the sinus in the region of the knee in the right side.

A diagnosis of bone necrosis with labyrinthian irritation was made and radical mastoidectomy was advised. The patient consented and was operated upon by me in September, 1922.

At the operation no exposure at the knee was found. Instead, a large cell filled with detritus was seen. The lower half of the roof of the tympanum had a roughened appearance. A Schwartz Stache operation was done. The patient made a rapid convalescence and in seven weeks the ear was dry.

For five weeks there was a discharge in the canal and the mastoid cavity was only slowly dermatizing. I then used 5% Scarlet Red Emulsion and in two weeks the dermatization was complete and the ear became dry. Since the operation, the patient has gained twenty-four pounds in weight and has been free from her attacks of Labrynthian Irritation.

Case of Sinus Thrombosis with Meningeal Symptoms. Dr. A. N. Schiller.

A. H., age ten, was admitted on August 24, 1922 to Beth Israel Hospital on Dr. Kopetsky's service with the following history:

Right ear began to discharge two years ago. Since then the discharge has been intermittent. Present history started two weeks before admis-

sion to the hospital, beginning with a cold in the head and two days later she experienced pain in her right ear. The pain continued for forty-eight hours, being followed by a discharge which lasted for two days. During this period the patient ran a temperature. Two days previous to admission she had a chill followed by a high temperature. The case was sent into the hospital by my associate, Dr. Joseph Miller, with a diagnosis of acute mastoiditis and probable sinus thrombosis.

The patient was seen by me the day following. Inspection showed a well nourished child in a semi stupor from which she could be aroused with difficulty. Pupils reacted to light and accommodation. Examination of the right mastoid revealed no definite tenderness and no odema. However, previous to admission and on admission, there had been marked mastoid tenderness and the patient had been mentally alert. The right canal had some mucopurulent discharge, there was a central perforation and slight sagging of the posterio superior wall. Examination of the left ear and mastoid was negative. No Babinsky or Koenig were present.

Blood examination was as follows:

Red blood cells, four million and eighty thousand, haemoglobin, 66%: White cell count, 11,000—polymorphonuclear leucocytes, 81%.

The urine was negative.

Heart, lungs and abdominal examination, negative.

The right mastoid was opened and extensive destruction was found, the type being coalescent. The sinus lay exposed in the mastoid cavity and on its inner aspect a gangrenous area about ¼ inch in diameter was observed. The mastoidectomy was completed and the sinus exposed from the knee, well down to the bulb. The wound was then packed and the patient returned to the ward.

On the 26th, the day following the operation, the patient had a distinct chill with a temperature of 105. On the 27th, another chill occurred and the temperature rose to 104½. A few hours after the second chill, the child was returned to the operating room and the wound inspected. The sinus looked much worse, took on a gangrenous appearance, was bulging and little pulsation was felt.

The jugular was exposed and ligated above and below the facial vein. A third ligature was placed around the facial vein itself. The sinus was then opened and a large clot exposed. This was removed with but slight bleeding but it was not considered sufficient. The sinus was further exposed for 1 and ½ inches towards the torcular and freely opened, and the inner surface found to be gangrenous. An anotamical forceps with its end held firmly together was then inserted into the sinus and directed back towards the torcular for a distance of about ¾ of an inch, and the ends permitted to fly apart. The usual packing of iodoform gauze was then inserted to control the homorrhage, and the patient returned to the ward.

The same day a transfusion of 250 c. c. of citrated blood was given. The patient made an uneventful recovery.

Examination of spinal fluid was negative. The two blood cultures were taken previous to the second operation and were reported negative.

DISCUSSION.

Dr. Hays said that all four cases were exceedingly interesting, and that Dr. Bowers' cases especially caused him to think a good deal. In all probability any patient who runs a temperature for three months should have the ears examined. On being informed by Dr. Bowers that the hearing had not been tested, Dr. Hays cited a case observed several years ago. He was called to see a child who had been running a temperature of 102-3 for three weeks; the father stated that the child was not hearing very well. On examination the hearing was found to be diminished, but there was no pain over the mastoid and nothing to indicate a mastoiditis; the drums on both sides were lustreless, but there were no signs of reaction. A double paracentesis was done, followed by a gush of pus from both ears. Later the child developed a sinus

thrombosis and was operated upon, the jugular being ligated; six months after leaving the hospital it developed infantile paralysis and died. In Dr. Hays opinion it was a question as to whether the child really had infantile paralysis or whether its death was due to some focus left in the system. It is extremely important that these children should have their ears examined.

Dr. Hays did not agree with Dr. Bowers that the facial paralysis was the result of a toxic condition, and thought that both children had considearble circulation disturbance due to ligation of the jugular in the . . . It is very unfortunate to have a patient develop a facial paralysis, and we usually feel that it is due to some error in technic when it occurs on the same side as the operation.

Dr. Schiller was certainly to be congratulated on the recovery of his two patients. The case of sinus thrombosis with mental symptoms was not unusual; in a case of double mastoiditis which he had reported before the Section the child had to be re-operated on the opposite side. A lumbar puncture was done, showing 23,000 leucocytes to the cmm. An unfavorable prognosis was given by the doctors associated with the case, who said the condition was hopeless. The family asked if there was any objection then to having a Christian Scientist see the child, and was told that it would make no difference. The next morning when Dr. Hays went to see the child it was sitting up in bed, and in the course of the next few days entirely recovered.

Referring to the case of chronic otorrhoea with labyrinthine symptoms; it is not ordinarily necessary to go into the labrinth. A radical mastoid will clear up the condition in nine cases out of ten. He then cited a case with a radical mastoid on one side and acute symptoms in the other ear, from which there was a chronic discharge. The question arose what should be done. Feeling reasonably sure that if a radical mastoid operation was done on the other side the hearing would be decidedly worse, a simple mastoid operation was performed and the labyrinth left alone. The patient recovered with a fair amount of hearing.

Dr. Bryant, referring to the case of double mastoiditis, stressed Dr. Bower's remarks which, he said, corroborated his own experiences in many cases where there had been nothing in the appearance of the drum membrane to indicate the presence of middle ear suppuration. He said he had also seen cases of mastoiditis without any of the ordinary symptoms, even without tympanic perforation, and he recollected having been present at several autopsies where venous thrombosis, meningitis, mastoiditis, and middle ear suppuration had been discovered. Some of three cases were with tympanic perforation, others were without perforation. In all of these cases during life no symptoms had pointed to the ear or its complications as the source of the illness. Nevertheless, the autopsies proved the undiagnosed complications of the unsuspected ear suppuration to have been the primary cause of death.

Dr. Bowers' observation of a sinus thrombosis with facial paralysis on the opposite side, seemed to have very great medico-legal value. Granted that this facial paralysis was of toxic origin, then the same explanation of *toxic* might be applied to facial paralyses following ear operations where there had been no traumatism of the facial nerve. The forensic value of this argument in rebuttal of malpractice suits in cases of alleged surgical traumatism as the cause of facial paralysis should not be forgotten.

Dr. Bryant agreed with Dr. Hays that intracranial symptoms of meningeal irritation were the rule rather than the exception in cases of venous thrombosis of otitic origin.

Referring to the case of chronic otorrhea with labyrinthine irritation, Dr. Bryant said he had found it the rule that labyrinthine irritation subsided promptly after drainage and cure of the suppurating middle ear tract. He had observed no exception to this rule in his personal practice.

Dr. Maybaum said that Dr. Bower's first case was such as was seen quite frequently two or three years ago at the time of the influenza epi-

demic. The are the so-called latent types of mastoiditis. The course of these cases is insidious. Dr. Hays' point regarding the marked impairment of hearing in the cases with little or no change in the middle ear. was well taken. Another point of importance is the type of infection—usually streptococcus mucosus. He did not recall that Dr. Bowers mentioned the organism found in his case.

Choked disc reported in the second case does occur but not commonly. He had recently observed a case of sinus thrombosis in which the choked disc persisted for a long time after the patient's recovery. The facial paralysis on the opposite side is probably to be explained by the severe toxemia.

Dr. Maybaum complimented Dr. Schiller upon his decision to operate in spite of a negative blood culture report, after excluding other factors. Without question in most cases of sinus thrombosis, if one examine the blood repeatedly, sooner or later a positive culture will be obtained. On the other hand one may dilly-dally too long in some cases and obtain a positive culture report when the patient is almost in extremis. Dr. Maybaum cited an instance of double acute middle ear suppuration in which the ears had completely resolved, but septic temperature persisted over a long period. A positive culture was finally obtained. The child recovered from sinus and jugular operation.

Evidence of labyrinthine irritation in the presence of a chronic middle ear suppuration undoubtedly calls for a radical mastoid operation; occasionally the labyrinthine symptoms continues after operation. Some time ago he reported such a case before the section. The radical cavity had completely healed, but dizziness persisted for a long period. Hearing and normal vestibular fuction was present in this ear. The other ear had been suppurating for a number of years but was not badly involved. Adrenalin chloride administered internally gave prompt and complete relief. Some of these cases are possibly due to a perilabyrinthine vascular disturbance.

Dr. Heldt asked Dr. Glogau if he would be good enough to give briefly the detailed histoligical structure of the stria vascularis; and also would he explain the reasons for the special susceptibility of the stria vascularis to the noises producing occupational deafness.

Dr. Alfred Kahn said that Dr. Bowers had done well to bring such excellent cases before the Section, that such cases do occur from time to time, especially in children. One often has occasion to notice a discharge in young children and in these cases one should feel behind the ear for a subperiosteal abscess, and if this is found the child is put in the hospital. It occasionally happens that a child's drum is very thick and does not perforate so readily as in the average case, and these cases will frequently develop a subperiosteal abscess; if the child is older it is likely to have a mastoiditis, the bone being not so soft as in the infant.

In the second case of facial paralysis on the opposite side, it would logically seem too him that the facial paralysis was due to pressure.

Dr. Kahn then asked Dr. Bowers how he would differentiate between pressure symptoms and toxic symptoms. It would seem, coming after the ligation, that the paralysis would have some relation to the ligation.

He also asked Dr. Schiller why he ligated the vessel above the facial and also below, and also a branch vessel. Why did he use that extreme precaution? In the case of chronic otorrhea with labyrinthins irritation a diagnosis of otosclerosis was made. There was no nystagmus in that case. Where there is a chronic ear, a radical is indicated. With the diagnosis of otosclerosis, how did the operation affect the radical ear.

Dr. Heller said it was not always necessary to have a sinus thrombosis, and cited a case of a young girl treated for acute indigestion giving all the signs of an acute meningitis with a middle ear and mastoid, who was operated upon promptly. Spinal puncture before operation showed 500 cells per cmm. under increased pressure but nothing more was found at the operation than a simple but extremely necrosed mastoid. The sinus was not exposed, as there was no indication for going any further.

The culture of spinal fluid however, was negative. The next day the patient was almost ready to sit up; the headache and vomiting had ceased, and two or three days later she did sit up and made a good recovery. We do not always need the irritation of the lateral sinus thrombosis to cause this infection. The involvement of the mastoid alone can give meningeal symptoms.

DR. HAYS said he wished to make one remark on Dr. Bowers' case of facial paralysis, just to show what may happen. A year or two ago a child developed a retropharyngeal abscess. A week later it went into the front room and on chewing a piece of candy it had a sudden gush of blood and was almost exsanguinated. The family physician fortunately happened to be present and with ice and pressure stopped the hemorrhage. It was decided that when the child wakened she should have a transfusion, and that was given six hours later. The following morning the child waked up with a facial paralysis on the opposite side, and almost complete hemiplegia on the affected side. No explanation had yet been found, but the idea was suggested that the paralysis was caused by the extreme pressure exerted on the carotid on that side.

DR. DANZIGER, referring to Dr. Bowers' case of facial paralysis on the opposite side, said that Dr. Bowers made the statement that at one time the patient showed nystagmus on both sides and that the cerebellum was not functioning sufficiently to cause the symptoms—and asked that Dr. Bowers give a little further explanation.

Referring to Dr. Schiller's cases, he said that one has to differentiate between the toxic conditions and the pathological processes. It was evidently a toxic condition of the labyrinth, for there was hearing on both sides, and no nystagmus symptoms, no excitation, or abolition of the function of the labyrinth.

Even in instances of real pathological lesions, as labyrintheal fistulae with paralabyrinthitis nobody would entertain the thought of entering the labyrinth, as long as there was any fuction left. All that is required in such cases is a radical operation, after which the labyrintheal symptoms will disappear.

DR. BRAUN said that as a general rule there was no question about the inadvisability of entering the labyrinth when there is any labyrinthine function, but that there were exceptions. Four or five years ago he performed a radical mastoid operation on a middle-aged woman, and then lost track of her. Two years later she returned, suffering with headache and a very intense vertigo, which had troubled her for several months. Examination of the radical cavity showed cicatrization except for a little hole in the anterior part, from which some foul-smelling pus exuded. There was some function in the ear, as shown by the fact that she had some hearing. It was decided to explore the mastoid cavity, and on clearing away the cicatricial tissue he was astonished to find that the cochlea was completely destroyed. The promontory was gone, and on clearing away the granulation tissue, only the inner shell of the cochlea remained. When the radical cavity was healed, she was again tested, and found to have some hearing in the operated ear, a Barany noise apparatus being used to exclude the hearing in the good ear. It was thought that perhaps the noise apparatus was defective, but on using two noise apparatuses, one in each ear, she could hear nothing. This was a case where operation on the labyrinth was definitely indicated, although there was some labyrinthine function remaining.

DR. BOWERS said that Dr. Hays' point about the hearing was very important. He had frequently seen cases of mastoiditis with practically no signs with exception of loss of hearing in an ear which gave the history of pain or discharge sometime in the preceding few weeks. Another significant sign was lack of improvement of hearing after inflation.

The infection in the case was the pneumococcus group which is the organism most commonly found in this type of case.

As to the differential diagnosis between pressure cause and toxic cause in these cases of facial paralysis and choked disc; the fact that both patients were markedly toxic, one of them having toxic joints and

multiple abscesses; the fact that the choked discs were not typically due to pressure; the fact that the choked discs cleared up before the facial paralysis, would indicate that the condition was probably toxic.

As to the cerebellum not functioning properly, he was quoting from Dr. Kennedy's notes.

Paper: Recent researches on the Normal and Pathological Histology of the Inner Ear (a lantern slide demonstration of the Labyrinth and its Pathological changes associated with Different Types of Deafness. Dr. Otto Glogau.

DISCUSSION.

DR. HAYS congratulated Dr. Glogau upon the excellent research work presented. The impressive point in all the cases examined was that pathological changes were found in the internal ear. If that was a fact, the methods of treatment now in vogue are of no use from the pathological point of view. Practically however, results are obtained, and it seemed to be a question whether the cases where results are obtained are like those which Dr. Glogau examined histologically. If we are to assume that there are changes which take place in the internal ear, how is it possible that there is such good transmission of sound by bone conduction, etc.? We are able to do something for certain individuals, and enable them to hear by artificial means. We have come to the point where we must correlate our pathological experience and our clinical experience. It was greatly to be regretted that so few men had the opportunity to do some of this work.

DR. HUBBY said that the endolymph was in a closed cavity with no communication between the ductus cochlearis and the perilymph, therefore the stria vascularis could have nothing to do with the secretion of the perilymph.

He inquired about the drying up of the endolymph. Of course if the endolymph dries up there will be an atrophy of the contained structures. When does the stria vascularis cease secreting?

What is the etiology?

DR. BRYANT said he could not let Dr. Glogau's view of the normal histology of the neuro epethelium of the end organs of the inner ear pass without comment. The results that Dr. Bryant had gotten in over ten years of histological work on these most delicate structures at the Pathological Laboratory of the Manhattan State Hospital and the Histological Laboratory of the Pathological Institute of the State of New York had shown him a very clear view of these neuro-epethelial organs which was wholly at variance with the discription given by Dr. Glogau.

Dr. Bryant claimed his preparations showed beyond question that the cupolae of the cristae of the ampullate and of the maculae acousticae of the sacule and utricule as well as the tectorial membrane of the organ of Corti were all gross artifects made by the aglutination of the sensory hairs of the neuro-epethelium of these organs brought about by the chemical reagents used in the usual histological preparation of microscopic specimens of the inner ear.

Dr. Bryants' sections showed all transitions between the long unaglutinated neuro-epethelial sensory hairs to the typical classical copolae and tectorial membranes composed of striated masses of non cellular tissue. The best slides were obtained from the cristae and masculae of laboratory animals, less perfect ones were made from the organs of Corti of these animals.

A special desecting, fixing, imbedding and sectioning technic had to be employed for the best results: Namely, live desection of portions of the osseous laborinth, immediate immersion of the specimen in the fixing fluid, hardening, and imbedding. Decalcification of the laborinthine capsule had to be wholly abandoned. After hardening, then imbedding, then desection of parts of the membranous laborinth, freeing from all bone, then reimbedding and sectioning. For human material the freshest obtainable at electrocutions and hospital autopsies was employed. The

human results were extremely difficult to obtain, requiring repeated attempts continued over long periods.

Dr. Bryant had demonstrated a series of his microscopic specimens showing these neuro-epethelial structures as he describes them at the 9th International Otological Congress, Boston, 1912: Transactions, page 52. He has given a description of the neuro-epethelium in "Diseases of the Nose, Throat and Ear", Knight & Bryant, Philadelphia, 1909, pp. 439 and 439. Also in "Tone Perception", Transactions of American Otological Society, Vol. XI pt. II, 1909, p. 328.

Dr. Bryant agreed with Dr. Hays that the classical pathological histology of the inner ear does not give satisfactory answers to the questions asked by the symptoms noated in clinical observations.

Dr. Alfred Braun, referring to Dr. Heldt's inquiry about the stria vascularis in occupational diseases, said that it has been proved that occupational deafness is due to fatigue and breaking down of the hair cells. Witmaak, in experiments, put a rabbit into a closed chamber and subjected it to the sound of a continuously vibrating tuning-fork, and found that after a time, certain hair cells in the organ of Corti broke down and degenerated. That is what happens in occupational deafness. The final result is an atrophy of the organ of Corti.

Dr. J. Morrisset Smith said that one occasionally sees a mastoiditis where the drum had been incised, and the incision healed yet the infection remained in the mastoid cavity. The streptococcus mucosus is very apt to be the causative organism in this type of case. He did not remember ever having seen an operative mastoid case without a history of first having had a middle ear infection.

Dr. Bowers' two cases of facial paralysis on the opposite side of the sinus thrombosis were extremely interesting, and he did not recall having seen or heard of such a case before. As Dr. Bowers stated, the most plausible explanation seemed to be that it was a toxic condition.

Referring to the case of sinus thrombosis with meningeal symptoms, Dr. Smith said that one is very apt to have meningeal symptoms in any case of sinus thrombosis, and any such case calls for a spinal fluid examination. If the patient is unconscious and repeated spinal fluid analysis are negative to bacteria, there is still a chance for recovery. The case that Dr. Hays reported did not have organisms in the spinal fluid; where you do have organisms in the spinal fluid they all die. In cases of labyrinthine irritation, one must determine whether the labyrinth is active, if so, opening the labyrinth is absolutely contra-indicated.

Dr. Glogau, answering Dr. Hays' query said: In most instances of chronic progressive deafness not the entire organ of Corte is destroyed. Some of the acoustic cords, either for the perception of the low or high sounds are preserved, forming islands of hearing. By stimulative and reconstructive treatment the corresponding protion of the cochlea may be restored in its function. However we must bear in mind that we have almost exclusively to do with reeducation, where lip reading plays an important role. The reflex arch between skill in lip reading and improved hearing is not yet known, but it is doubtlessly of great important in oral training of the deaf and also in the treatment of the hard of hearing. Bone conduction is present in quite a number of deafness, where Corte's organ is partially or totally destroyed, as long as the conductability of the acoustic nerve proper is still preserved. In such cases bone conduction acts on the acoustic nerve similar to galvanic irritation of the optic nerve, in case of peripheral blindness.

Replying to Dr. Hubby he said that it was not definitely known in which condition the degenration of the stria vascularis takes place. Primarily it seems to occur in leucaemia and also in arterio sclerosis. The endarteries of the labrinth become occluded and gradually the stria disappear. With it the production of endolyph stops and a secondary degeneration of the nerve end cells occurs.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

February 28, 1923.

A Further Report on the Epithelization of the Maxilary Sinus in Chronically Diseased States. "Summary." Dr. J. E. Sheehan.

The graft is cut preferably from the right inner aspect of the thigh to include the papillary layer of the corium. If properly cut only a slight amount of punctuate bleeding ensues. (Davis.) This graft is placed upon a metal plate with its raw surface uppermost and evenly spread out. It is then covered with gauze wet in physiologic salt solution, until used in the area to be grafted. Several small grafts are placed over the exposed dry bone of the antrum and made adherent with the use of the Ballance catheter. Even and firm pressure upon the engrafted area is assured by inserting a small balloon with catheter attachment through the nose and inflating it to the desired degree of tension. The external wound is closed by suturing with horse hair and sealed with tincture of benzoin. After the fourth day the baloon is deflated and removed through the nose. The sinus is irrigated with five per cent solution of magnesium sulphate and dried with air irregularly until desquamation is complete. Upon inspecting the cavity there is then found a white even smooth surface. Elevation of temperature rarely exceeds one degree.

Formerly I used strips of gauze and later pledgets of cotton saturated in Dakins solution to exert pressure upon the graft. I have now abandoned their use as the reaction in many cases was quite severe and the success of the graft uncertain.

General Results of Operation: Twenty cases in all, twelve males and eight females, constitutes the experience from which these observations have been drawn. In fourteen of these the graft was an immediate success. Of the remaining six, two were subsequently regrafted successfully. Those fourteen cases were discharged as cured in from ten to thirty days. The unsuccessful cases took from five and a half weeks to four months to heal. One case developed a very persistent form of osteitis which took quite three months to subside. Another had a severe infra-orbital neuralgia, lasting four weeks in which the patient passed through a stormy and agonizing period.

The fairly large number of unsuccessful cases I attribute to faulty technique. Since that has been improved and we have adopted and perfected the use of the balloon our methods are more assured and our results better.

The advantages of epithelization of the maxillary recess after the removal of disease are:

1. The mucous membrane is replaced by skin which assumes some of the function of membrane.
2. The formation of scar tissue is prevented.
3. Weeks and possibly months of irrigations are rendered unnecessary.
4. The cavity is not packed with gauze and the after treatment is consequently short and not painful, with very little local or general reaction.
5. The skin changes its character after a period of weeks, assuming a pinkish white color.
6. The patient is returned to a state of health in a comparatively short period of time.

DISCUSSION.

Dr. Ferris Smith (Grand Rapids) expressed appreciation of the fact of being able to join in this discussion of a subject in which he had been deeply interested for four years past, during which time he has been the object of considerable criticism and had participated in a number of rather bitter discussions on the subject of skin grafting of the maxillary antrum. It seemed better to begin with a brief analysis of the situation and to review some of the facts in chronic antrum disease, without touching on the diagnosis or pathology, but merely on some of the facts which relate to the treatment of antrum disease, and some of the results obtained.

In a recent discussion at a large rhinological meeting, one of the men, the chief of staff in a hospital of 300 beds, said that in that hospital during the preceding year there had been no instance of the radical antrum operation, and in support of that fact said that there were no cases that could not be cured by ordinary ventilation and proper medication. Dr. Smith said that all those present who had seen any number of these cases would agree that every possible condition of pathology in a membrane of this type may be found at some stage in a chronic antrum—everything from a localized area of suppuration to a suppurative process involving the entire membrane, with a membrane undergoing a polypoid degeneration that presents no possibility of getting well by irrigation, ventilation, or treatment. That is true for several reasons, the most important of which is that the membrane has a very poor blood supply normally, and when it becomes diseased the blood supply is lessened continually and there is nothing to repair the process. In support of this it might be said that he heard none of these gentlemen claim that simple medication and local treatment would take care of a suppurating polypoid ethmoiditis, etc., which exactly parallels the condition in the maxillary antrum and which require a long time to heal. If an ethmoid suppuration with polypoid degeneration cannot be cured medically, and there is the same condition in the maxillary antrum, there is certainly no hope of curing that type of antrum disease by medical treatment. It is claimed by some that 70 per cent of the cases of antrum disease will get well under proper irrigation and treatment; the remaining proportion represents what Dr. Sheehan has to deal with and in which Dr. Smith is interested. Dr. Smith said he does not think that the figure of 70 per cent is anywhere near right. During the past ten years, excepting for the years of the war, he has been seeing from 100 to 150 cases yearly and treating the condition by the same operation that these gentlemen have been performing—making a large window opening, etc., irrigating and treating the antrum for six weeks in addition to the operative work. If at the end of six weeks there is no evidence that the antrum is healing, or if there is not considerable evidence of healing, he regards the condition as requiring some sort of radical operation.

Turning to the list of operations that have been proposed, the first one used for a considerable time is the Caldwell-Mickulicz operation, which howewver offers little hope of success. As every one knows, the opening quite rapidly fills in with granulation tissue. Furthermore, such an operative procedure permits examination of only the lower portion of the antrum, and in a large proportion of cases the disease is not there.

The next operation in sequence of value is the Canfield operation, with very fair results in many cases.

The cause for failures is the failure to remove all of the polypoid degeneration, etc., the majority of the failures being probably due to failure to clear up the anterior superior angle. The next operation, the Caldwell-Luc operation, is open to the same critiicism, it does not permit inspection of the entire antrum.

The operation used by the speaker and by Dr. Sheehan, as described by Dr. Sheehan, permits of entire inspection and treatment. The added value of the skin grafting is to save the patient weeks of tiresome, painful treatment and it produces a result which is far superior to any result from packing and irrigation; Dr. Smith said that that statement was borne out by 70 cases upon which he had operated in this manner, and he had the same number of failures to report as had Dr. Sheehan—in fact he almost duplicated the doctor's failures as described, and he considered that all of them were due to failure in technique.

DR. MACKENTY said he was very much impressed with the evidence presented by Dr. Sheehan and Dr. Smith on the question of healing of these old chronic antra. Any man who says that all antrums can be cured by intra-nasal methods is lacking in experience. By the intranasal method employed by many few if any are cured. By an intranasal method which takes down a considerable part of the wall, many more are cured, but there still remains a large number which must be

treated through the external route. Of course, the trouble is that many of these antra cases are secondary to upper sinus disease, and are only secondary. That antra cannot be cured unless the upper sinus disease is first cured. When the disease is located in one antram and does not attack the other sinuses, it is generally due to a tooth infection.

Referring to antrum disease that does not heal in a given period, Dr MacKenty said he would allow a longer period for ahe healing than six weeks; if after three or four months it has not healed, it should be operated upon through the mouth.

There were some questions he would like to have answewred: How much regenration is due to the internal flap and how much from the skin graft? If one has a good flap turned in, it seems probable that much regeneration crawls up the wall, especially if the anterior angle of the sinus is removed.

Another question: Does this method of grafting ever produce cholesteatoma? When the skin grows into the middle ear, cholesteatoma frequently results. Has cholesteatoma occurred in the series of cases reported by Dr. Sheehan and Dr. Smith?

Referring to the question of local anesthesia, Dr. MacKenty said that he does not get good local anesthesia by simply injecting the anterior wall. He also anaesthetizes the sphenopalatine ganglion. Does the chronic infection in the antrum interfere much with the lift of the graft?

Dr. MacPherson complimented both Dr. Sheehan and Dr. Smith on the reports they had been able to make. There are some things that might well be improved in radical operative work on the antrum, especially in order to prevent the different sequellae of antrum operations as now carried out. First, the pain that follows and that may be protracted and prolonged. That is commonly due to the development of a periosteitis and nauritis. Of course, in any operation we try to prevent or lessen the injury to the nerve, thus attempting to avoid the neuritis, so that skin grafting does not lessen the pain unless it does so by acting as a protection to the uncovered bone. The second disagreeable sequella is quite frequently a leaking from the nose after the radical operation; when the pateient puts down his head there is a dripping. It is possible that the skin graft may prevent that. Re-infection is a third point. If the number of reinfections can be lessened by skin grafting, an advance has been made.

Dr. MacPherson said that he himself had not had any reinfection take place after operation, that did not respond promptly to treatment. Dr. Sheehan claims that he has lessened the number of re-infections by this operation, which is probably correct.

As to the length of convalescence, Dr. MacPherson said that in quite a large proportion of the cases that he sees the convalescence does not extend over a month. The cases are irrigated for two or three weeks after operation, and it is not unusual for treatment to cease after three weeks have elapsed and occasionally after two. This result, however, is not equal to the report given tonight following skin grafting where 10 days after operation treatment may cease.

Another complaint is the devitalizing of the teeth. Dr. MacPherson said he did not know whether or not that happens; the skin graft operation would not prevent this complication.

The advantages claimed for the skin graft, summed up, are: The possibility of lessening the pain; the lessening of infection; and the shortening of the period of convalescence. If any one of these lessened in severity complications, and if there is no loss as compared with other operations, there has been a distinct gain. The number of cases so treated, however, is too small as yet compared with other methods to reach a definite conclusion. That can only be decided after statistical comparison of a large numbe- treated by the different methods.

Dr. Henry Sage Dunning said it was most necessary to first make a correct diagnosis in maxillary sinus cases. Before treatment it is necessary to know whether it is caused by a descending infection from the

nose and accessory sinuses or an ascending infection from the mouth and teeth. It is not necessary very often to remove the lining membrane of the maxillary sinus. Generally gentle curetting or rubbing the diseased membrane with a pieces of gauze will clean off polypoid tissue and stimulate healing. We therefore do not need to cover over bare bone very often in the antrum. It is intensely interesting and a fascinating problem.

Dr. Dunning said he had enjoyed Dr. Sheehan's paper very much indeed and felt that he deserves great credit for the work he has done along these lines. Several points occurred to him which would tend to make this procedure of epithelizing the antrum very difficult—namely, the inequalities of the antral floor at times, there being frequently partitions dividing the floor into deep grooves. Can Dr. Sheehan keep the graft close to the bone in these cases and does he have to overlap the grafts in putting them in place? What percentage of sloughs does he get? In other words, how much of each graft takes and how much is lost? Are there not inequalities in the bone into which the balloon will not go?

He said further that the most chronic antral infections will clean up if all oral and nasal pathology has been eliminated. In his experience it is rare to find a case that needs skin grafting. In war cases where there is a great amount of infection and trauma, this procedure would be of use quite often, but it would seem that in civil life the surgeon will be called upon to perform this operation only in the very extreme cases.

Dr. H. S. Vaughan said that the operation just described by Dr. Sheehan was quite unique and showed well the great advances that have been made in plastic surgery. All agree that a large number of the chronic antral infections cannot be cleared up by therapeutic measures alone. His experience with the radical operation is that healing is secured in all cases where the polypoid degenerated membrane is thoroughly removed. These cases, have to be irrigated sometimes for several weeks, but they will eventually clear up. If Dr. Sheehan's operation succeeds in shortening that period it will be a marked gain.

As to the epitheliazation of the cavity, Dr. Vaughan cited a recent case of marked infection in which the entire maxilla was destroyed by gangrenous ulceration, extending into the spheno maxillary fossa and orbital cavity. In this case the bone exfoliated in about six weeks, and almost by the time the exfoliation was complete the cavity was entirely smooth and apparently epithelized. It would seem that epitheliazation takes place very rapidly, leading one to wonder if it is such a problem after all.

Dr. Harris complimented Dr. Sheehan on his excellent presentation of the subject, and especially on the excellent work which the paper represented. He could not be too highly praised for his efforts in endeavoring to perfect the technique of the antrum operation.

He then stated that he was more radical than one of his friends who had spoken earlier in regard to the time one should spend in irrigating the antrum, and that in his opinion it was time lost to spend three weeks to two months in so doing. After deep pathology has been demonstrated in the antrum, radical work is usually required. All will come to that sooner or later. He is ignorant of any statistics that show so large a percentage of cures in such cases without operation.

As for skin grafting in such cases, that is a large question, whether the statistics are such that we are warranted in going ahead and doing this extra work Dr. Sheehan had demonstrated a wonderful technique, but are we justified in doing it. Dr. Harris said he could not agree with Dr. Sheehan on that point. He has followed the radical work in two large hospitals and the operative results of the dozen or twenty men who have been doing this work on the antrum is uniformly good, and the great majority of the cases that come back after a time show the healed condition. In his experience, weeks of irrigation and packing, are by no means the rule. It is quite the contrary. As Dr. MacPherson pointed out only a short time is required and the cases get well and stay well.

Dr. Harris said he wished to emphasize what Dr. Vaughan had said. By doing a complete operation and getting out all the polypoid mucous membrane, and treating the cavity as in operations on the mastoid, a good result is to be expected. Where a complete antrum operation is done, the number of cases that get well and stay well is large; but if an incomplete operation is done the cases will not get well, and in such cases the skin graft may help. Dr. Sheehan's work is highly to be commended and in exceptional cases it is indicated, but he has yet to show that it is indicated in the majority of cases.

Dr. Gustav J. E. Tieck agreed with Dr. Harris that Dr. Sheehan had given a very fine paper but stated that in his opinion epidermis did not belong in that cavity and in his opinion was impossible to completely epidermitize every antrum. One cannot heal the antrum by transplanting epithelial tissue. I do not believe that the epidermis could be coaxed over such irregular surfaces as the antrum usually shows; full of protuberances, spicules, nitches, etc. We have encountered that experience in radical operations on the ear with the very best transplantation of the skin flap. There always remain certain spots that will not heal for a long time and here you have a much more smooth surface. The forming of false cholesteatoma, shedding of epithelial cells, dryness of the sinus, changing the laws of nature, are points against it. After proper diagnosis of the antrum disease has been made by excluding all other sinuses, such as frontal, anterior and posterior ethmoidal and sphenoidal and after all the simple operations from the inside of the nose, such as washing or establishing drainage under the inferior turbinal, etc., have failed, and if the discharge from the antrum is still putrid and foul smelling, indicating that not only the lining but the bone has become involved, then some radical form of operation is indicated. This is done by removing the complete anterior wall of the maxillary bone. The result of the operation is accomplished either by keeping the cavity if it is possible to coax the mucous membrane from the nose into it. The mouth incision must not be closed for you must keep this process under observation. Every bit of periostial lining must be completely removed and all the surfaces must be absolutely smooth. Iodoform gauze is used for the first six to eight days in order to stimulate granular tissue growth, then pressure exerted on the granular tissue by gauze or cotton soaked in burrows solution. By doing this you have two surfaces from which the mucous membrane can grow, nose and alvellar process, but as I have said before it requires smooth surface and the mouth cavity must be kept open until your process is completed. If you leave a small piece of periostium in some corner of the sinut and close your mouth incision a fistula will form and your antrum will still be discharging. The granular tissue must be hard and firm before the mucouc membrane will cover it. Of course all bad teeth in that vicinity or root abscesses must be eliminated. In some instances the teeth can be saved by filling the roots.

Dr. Carter said that after seriously considering what he had just heard in regard to the epitheliazation of the antrum, his faith was considerably strained—not his faith in the honest efforts of the men who are doing this work, but his faith in the conclusion they had reached in regard to it. He could not understand how one can get epithelium to grow on dry bone. In the next place if we do get it to grow, we still have epidermus to undergo disquamation and develop cholesteatoma. The antrum is lined with mucous membrane normally, and there is no record of epidermus undergoing transformation into mucous membrane. In Dr. Carter's opinion every antrum can be cured by intranasal operation if its bony walls are healthy and the frontal sinus and ethmoids are normal. If the bony walls are diseased, one should do the radical operation, removing the polypi and diseased tissue, and give the portion of the mucous membrane remaining an opportunity to regenrate and cover the antrum walls.

Nature never lines her inclosed cavities with epithelium and if it does occur by accident a dermoid cyst or cholesteatoma results.

Dr. Sheehan (closing discussion): I deeply appreciate Dr. Ferris Smith's coming to New York tonight to discuss this paper which you

know, gentlemen, necessitated his leaving an exacting surgical practice in the West. I am quite sure you will all agree with me that we have gained valuable knowledge from his remarks. It certainly thrills me to know that the results of the experimental work we have been doing in New York, coincides with the work of Smith. It is all the more interesting and exciting when you consider that we were working at posts many miles distanced from one another, our methods unknown to each other and practically arriving at the same conclusions.

1. I am in hearty accord with Dr. Mackenty that if there be disease higher up, i. e., in the ethmoidal labyrinth, sphenoidal cavity or frontal sinus, this disease should be eradicated before any operative work of a radical nature is performed upon the antral recess.

2. Question. Is there regereation of mucous membrane?

Answer. The mucous membrane does regenerate to some extent around the edges of the wound, this is particularly so, from the floor of the channel, but it is not extensive.

3. Question. Does cholesteatoma form?

Answer. If one follow the technique as described tonight, in particular, the cutting of the graft very thin, cholesteatoma will not form. If the skin is cut too thick, heavy desquamation will be the penalty.

4. Question. Local anaesthesia is not satisfactory to me.

Answer. I perform most of these sort of cases under a local anaesthetic with most gratifying results. The nerves supplying the operative part are thoroughly anaesthetized by injecting them with Novocain in solution.

5. I agree with Dr. Mackenty that every known treatment should be given a trial before radical surgery is performed. I do not however feel there should be any set operative time formula in these sort of cases, as each case is a law unto itself.

1. Question. Is pain minimized in the use of the skin graft,

Answer. No. The inplantation of skin has nothing to do with the lessening of pain. I attribute the reduction of pain to the absence of packing and in the use of our improved technique.

2. Question. Leaking from the nose. If the graft successfully takes does this not occur?

Answer. This distressing state is absolutely blotted out. In fact this annoying condition more than any other led me to seek other means of treatment. I found it is skin grafting the sinus. Taken on an average, one obtains a dry cavity after successful epitheliaztion in less than three weeks.

3. Question. Does reinfection of the cavity take place?

Answer. Never. It is quite impossible to infect non abraided skin. However if one allows the cavity to heal with scar tissue, there is always that possibility.

4. Dr. MacPherson stated that he was able to cure chronic antral disease after a radical surgical operation within one month. Dr. Sheehan stated that he was never able to cure such cases within so short a period, without skin grafting. It generally meant in my hands weeks of irrigations and treatments, with considerable annoyance and agony to the patient. The end results of weeks of effort was scar tissue.

5. Question. Does devitalization of the teeth take place after a time?

Answer. It does in some cases, but the very fact that one implants skin to this cavity does not influence the condition one way or the other. There is no disadvantage of skin grafting this recess; if one fails, one reverts to the old treatment of irrigations, etc.

Dr. Dunning said he did not see why he had been called upon to discuss this paper.

Answer. I wished to obtain an expression of opinion from Dr. Dunning as to the causation of antral disease, as oral surgeons state, from 75 to 90 per cent of antral infections are dental in origin. I also wished Dr. Dunning to say a few words about Thiersch grafting as I understand he has had an extensive experience with this form of graft in the buccal cavity. Am I right in regard to this point, Dr. Dunning? He nodded assent.

2. Question. Is there any difficulty placing the skin on the bone?
Answer. None whatever, if one properly uses the Ballance catheter.
3. Question. What is the effect upon overlapping grafts?
Answer. The overlapped part of the grafts, macerates and finally expels itself.
4. Question. Will a balloon accept an irregular antral floor?
Answer. If the balloon is properly inserted and inflated it will accept any undulations of the antral floor which may exist.
5. Question. Does the grafts take enmasse or in bits?
Answer The whole graft takes as one piece.

Dr. Sheehan thanked Dr. Vaughan for his kind remarks. He said the history of the case as cited by Dr. Vaughan was not clear and he wished to discuss the case with him after the adjournment of the meeting.

I thank Dr. Harris for his generous introductory remarks. Dr. Harris is always so generous. It was gratifying to hear his honest opinion of this work and call a "spade a spade". Dr. Harris, however does not seem to think this work feasible. Why is it not feasible? Have I not demonstrated to you tonight, gentlemen, the feasibility of the work, through the medium of the lantern and also showing you antral cases which have been succesfully Thiersch grafted which is, after all the most caustic test. It is quite true as I have before stated, that each case is a law unto itself and you cannot say we will irrigate the sinus for 12 weeks and if it does not clear up during this time we will then advise radical surgery. If it is determined that the case be a chronic one, and after a thorough trial with intranasal procedures to effect a cure and we fail, then I say radical surgery should be advised. One may determine that it is necessary to operate certain cases in a radical way within a short space of time, in other cases it may take weeks of honest effort to come to a final decision.

3. Question. Is there justification for skin grafting?

Answer. What harm is there in skin grafting this channel? Dr. Sheehan said that since using an improved technique he has been obtaining almost 100 per cent takes; that is, the skin which is implanted becomes firmly adherent to the bare dry bony walls of the cavity. There is no doubt that the uniform results of the operative procedures on the antrum in the hands of eminent men in this city is brilliant; their ability and skill is not questioned. We have presented to you tonight an improvement on the operation they have been performing for some years past, which is much shorter, very much less painful, with very little local or general reaction, and which restores the patient to a state of health in a much shorter period of time. The formation of scar tissue is avoided, hence with successful skin grafting, reinnfection of the cavity is quite impossible.

Dr. Sheehan said that he was mildly shocked at the statement made by Dr. Carter, "that it was impossible to graft skin upon bone". Anyone having an elementary knowledge of the principles of plastic surgery would know that is not the case. I have demonstrated the technique of skin grafting the antral recess to you tonight, gentlemen, and have shown you cases where the graft successfully took to the walls of the antrum. The evidence is there, I have nothing to retract. In fact such a statement has no weight, since it has been made by one, who has had absolutely no experience in this sort of work.

Dr. Sheehan said that the whole of the exposed bony walls of the antral cavity, including the anterior superior angle. was successfully skin grafted inn 70 per cent of his reported series. This quite disputes the statement made by the Doctor.

2. Statement. I think the grafting of skin to this cavity is unnecessary?
statement is made from experience he has had in this field of surgical

Answer. Why? I should like to inquire of Dr. Thieck whether this work? If not, then the statement is worthless.

PHILADELPHIA LARYNGOLOGICAL ASSOCIATION

A stated meeting of the Philadelphia Laryngological Association was held on Tuesday, October 7, at 8:15 p. m., Cadwalader Hall, College of Physicians.

Dr. Emil Mayer of New York City was the guest of the evening. His topic was: "Tuberculosis of the nose and throat, with special reference to early diagnosis". Lantern demonstrations.

Dr. Mayer said that he had collected the illustrations for this address largely from cases he had seen. He had been to particular pains to have them all in color, and while they were not always the exact shade yet they were far better than the usual black and white, and one could recognize the diseased condition from the picture.

He wished to define the term "Lupus", which would be frequently alluded to in his address. He used the term Lupus to mean a condition of destruction, of greater or lesser degree, associated with proliferation, in which there were comparatively few symptoms, and no bacillus found in the sputum, no lesions in the lungs, and now and then a stray bacillus found in the specimen removed.

It was indeed remarkable how few symptoms, and how little complaints were associated with Lupus, and which yet belonged to the Tubercular class. It was important to maintain the distinction.

If we positively determine that it is a case of Lupus we can assure our patients that they have a prospect of a life of comfort for many years. One of Dr. Mayer's patients was under his observation for 18 years, never left the city, married, gave birth to healthy children and eventually died of general Tuberculosis.

So remarkable was the absence of symptoms that the discovery of a badly destroyed and worm eaten larynx came as a surprise. This was first noticed when an accidental examination of the larynx in a patient with Lupus of the face showed terrific destruction. This led to systematic examination of the larynx in every patient with Lupus, and many surprising results were thus obtained.

It means much that the patient can be assured that he has an affliction that is amenable to treatment, that he need not leave his home, etc., and that with improved methods of treatment, the end may be still further distant than it has been heretofore.

He felt therefore that the term Lupus should be maintained. The cases he had seen were none of them associated with Lupus of the skin.

The speaker said he would show just a few illustrations of the Pathology of the disease and then would present his colored plates.

Pathological illustrations were three in number.

Normal epithelium, subepithelial stratum thickened from 2 to 4 times. The normal diameter by a deposit of small mononuclear cells, each with a deeply staining nucleus and small protoplasmic body. Enclosed in this latter numerous small and large nodules or tubercles are found.

The giant cell, a globular body is composed of a central mass of granular protoplasm showing some degeneration, and a number of nuclei arranged in a semi-lunar circular or irregular form around the periphery but probably never in the center. The cell or cells occupy either the center or periphery of the tubercle.

Transformation of an infiltrate into an ulcer is due to the caseation of one or more subepithelial tubercles. The tubercles from their primary localization in the submucous tissues extend completely detached and destroyed and the ulcer thus formed enlarges to a continuation of the degenerative process in the individual tubercles and the coalescense of neighboring ones.

Among the illustrations shown were the following:

Tuberculosis (lupoid form) of the external and internal parts of the nose; tuberculosis of the anterior nares (lupoid form); tuberculosis in

the vestibulum nasi (non-lupoid form); tuberculous tumour of the septum; leukoplakia (Psoriasis Buccalis); tuberculosis ulcer of the tongue; tuberculosis of the gums (lupus form) tubercular gum inflammation; tuberculosis of the commissure of the mouth in the tubercular patient; tuberculosis of the mouth and pharyngeal cavity (lupus form); tuberculosis of pillars (lupus form); tuberculosis of the tonsil; tuberculosis of the right tonsil mucous membrane and epiglottis; tuberculosis (luposis) of the right tonsil; infiltration of the epiglottis and both ventricular bands, with edema of the left arytenoid, vocal cords ulcerated and thickened; infiltration of the epiglottis; ulceration of the lingual surface of the epiglottis; edema of the arytenoid cartilages; interarytenoidal thickening, one of the earliest pathological appearances of tuberculosis of the larynx; early lupus of larynx. Showing peculiar saddle-bag appearance of epiglottis the remainder of larynx normal; advanced lupus of larynx, showing destruction of epiglottis, with cicatrization, large indurations in the ventricles, while the remainder of larynx is entirely normal; ulceration of both ventricular bands; massive infiltration and extensive ulceration of the left ventricular band; bilateral arytenoidal ulceration and infiltration; ulceration of the right vocal cord and of the interarytenoid sulcus; one-third the epiglottis destroyed by ulceration, numerous erosions of the stump, extensive infiltration and ulceration of the ventricular bands and right arytenoid cartilage. The corresponding aryepiglottic fold is edematous; "saw-tooth" cords; ulceration and infiltration of the left ventricular band, the sulcus is filled by an ulcerated infiltrate and there is a large shallow ulcer on the lingual surface of the epiglottis; ulceration of the right vocal cord and infiltration of the corresponding arytenoid and ventricular band; tuberculosis ulceration of the trachea.

Referring to the question of early diagnosis, Dr. Mayer said that there were two points which he wished to emphasize.

First and most important was a yellow exudate. Second a form of thickening between the arytenoids.

The appearance of either of these two should make one immediately suspicious of beginning tuberculosis. Careful examination of the chest including Xray of the sputum, careful recording of rectal temperatures, night and morning for a week, will help materially toward diagnosis.

The speaker recited a case of a young lady who had been referred to him by her physician, with symptoms of slight irritation of the throat and short cough. An examination showed with the rhinoscopic mirror a small yellow spot on the posterior surface of the uvula. This was the only lesion.

Tuberculosis was diagnosed, and subsequently confirmed. Within a short time she went to the Adirondacks.

Four and a half years have now elapsed. The gain in weight of 35 pounds in the first year has been steadily maintained. She has found congenial work in the sanitarium, and is doing full time work and has long been placed among the list of cures.

Early diagnosis was her salvation.

One of the illustrations shown was that of a patient who had been referred to Dr. Mayer by a Laryngologist in Philadelphia. This patient has been under the speaker's observation for over four years.

The previous Laryngologist had used galvano-cautery on the patient repeatedly for tubercular laryngitis. Two-thirds of the epiglottis was destroyed and it all had a gnawed appearance.

In spite of the great destruction the patient has had no difficulty in swallowing, his voice is clear, and at no time during the past four years has there been any sign of a recurrence of laryngeal tuberculosis.

No better illustration of the value of the galvano-cautery treatment could be given than this. And this form of treatment ranks first.

It is remarkable how much of the epiglottis may be removed surgically in these cases, without harm, often being of great value.

Medication is often helpful and the speaker found that orthoform was most valuable in relieving the pain.

DISCUSSION.

DR. GEORGE W. WOOD: I believe that actual cautery for Laryngeal T. B. is the best treatment at the present time. There is a reaction produced in the tissue with formation of granulation tissue and scar formation and revascularization of the area cauterized. Lactic acid is of no avail, as it produces a sluff with secondary infection. X-ray and radium are of no good. Rest is very important if carried out completely in the true sense of the word, even avoiding whispering.

DR. ROBERT M. LUKENS: I would like to ask Dr. Mayer whether the redness of the soft palate has any significance in T. B. Also, should we place any stress in our early diagnosis when paleness of the soft palate appears. It is interesting to note just how much pathology is present in the Larynx without any symptoms. However, the earliest lesions are usually found in the posterior commissure which as a rule involves one or both of the vocal cords.

DR. LEO COHEN: The weight of opinion at the present time seems to be leaning towards cautery and medicants must however be used to relieve the pain but I know of none that are curative.

DR. SOLIS COHEN: I am very happy to be present with you this evening. I have always felt that actual cautery was very beneficial but I at no time understood its mode of action. Dr. Wood's explanation of revascularization with fibroid connective tissue formation was so vividly described that I now can see its action and can readily understand why so many people are relieved. Iodine is a good drug and should be administered internally and inunctions of some iodine product over the crycothyroid membrane should be employed. (Iodex.)

DR. HENRY S. WIEDER: I believe that the various pathological appearances that we see in the Larynx is due to secondary infections and depends upon the organism and the extent of the involvement. It is important to pay attention to general hygiene and dietetics in order to build up the patient.

DR. GEORGE M. COATES: St. Clair Thompson was a victim of T. B. Laryngitis. His treatment consisted of absolute rest without even a whisper. He used a pad and pencil to convey his desires and thoughts. At Saranac Lake they use the dropper method in conjunction with the absolute silence treatment.

DR. FIELDING O. LEWIS: Rest, proper food, and hygienic surroundings are most essential. The Rafus tube leading through the nose is a great adjunct to keep the patient from starvation.

Parotitis Suppurativa. Three Attacks. Dr. C. F. Adams, Trenton, N. J. Jan. 7, 1922. Ruth C.—Called at office: Well nourished, complained of pain and swelling in right side of face. Gave the following history:

Has had measles, tonsilitis several times, inflammatory rheumatism at ages of 9 and 13 years, and an abscess under the left arm when 14 years of age.

In 1906, when three years of age, was brought to the Mercer Hospital, with a swelling at the temporal canthus of the right eye, extending to the superior attachment of the right auricle. There was a discharging sinus at the canthus, through which a probe could be passed into the right maxillary antrum. This abscess began as a pimple near the eye, bursted and has continued to discharge since that time. Not much pain nor was the eye affected.

The operation, March 1, 1906, ether anesthesia.

An incision was made through the skin, from the external canthus of the eye to ¾ of an inch of the upper attachment of the auricle. Under the skin was a sac about the size of a walnut, filled with cheesey matter The sinus leading to the maxillary antrum was curetted, some necroid bone was removed, the wound lightly packed with gauze and partially closed with silk worm gut sutures. In 16 days the wound was healed and the patient discharged from the hospital.

April 5th, 1909, aged 6 years, she was again admitted to the hospital, with a mastoiditis and suppurating parotid gland right side. The parotid gland was discharging below the ear and into the pharynx.

A heath mastoidectomy was performed, the sinus of the parotid gland was curetted, and a thro' and thro' drain inserted, the ends tied thro' the mouth. She was discharged, recovered April 26, 21 days after the operation. Her hearing today is R-20/36 L-36/36.

The present attack began July 7, with pain and swelling in the right side of the face. No induration. Radiograph showed second right lower molar to be suspicious, was extracted without relief. Trans-illumination of sinuses was negative. Pain and swelling increased, could open her mouth not more than ½ inch. Temp. 101°. Was sent to the hospital Aug. 8, and on the 9th, under ether anesthesia, her mouth was easily opened and a round indurated mass, opposite the last upper molar could be palpated. This was incised and evacuated, about a dram of yellow pus being obtained. Two days later a much larger swelling appeared, she was again anesthetized, an incision from the posterior molar, forward, just below Stensons duct to the canine tooth was made and curetted, leading backward and outward toward the articulation, a rubber drainage tube was inserted and attached anteriorly to the mucus membrane. This tube was removed in 5 or 6 days. Streptococci and Staphylococci were found in the discharge, t. b. were looked for but not found. She was discharged from the hospital Aug. 24, 17 days after admittance. Abscess healed, unable to open mouth more than ¾ inch. By persistent effort to open her mouth by traction with her fingers, she can open it now almost as well as ever.

The fact that there have been 3 separate attacks of the same gland, over a period of 16 years, with a complete recovery, after each attack, and the etiology still obscure, is my excuse for making this report. Miculitz disease is chronic, with no systemic disturbance.

Presentation of Patient in Whom a Diagnosis has been made of Plastic Labyrinthitis, Probably of Congenital Luetic Origin. Dr. Wm. G. Shemeley, Jr.

To be published in a subsequent issue of THE LARYNGOSCOPE.

Case Showing Menieres Syndroms in a Young Man Nineteen Years Old. Dr. Henry S. Wieder.

C. R., male, age 19 years, a student at the University of Pennsylvania, while enjoying perfect health and with a previous history entirely negative with the exception of scarlet fever at six years of age, ate two fried egg sandwiches at three p. m. and went in swimming at 5 p. m., on June 5th, 1922. After swimming twice the length of the pool he commenced to feel rather queer when he arose to his feet. He then attempted to swim on his back, when he was attacked with violent nausea, vertigo and vomiting. His only relief was when in the lying posture. Vomiting was almost projectile when erect. He was taken home and shortly afterward seen by Dr. Napoleon Boston, who took his blood pressure and found it to be 150. Dr. Boston also discovered that he was deaf in the left ear so he referred the patient to me for examination. I visited him at his home at 9:00 the same evening.

Examination showed a well nourished young man, apparently in good health with the exception that he was not able to rise above the recumbent position without violent vertigo and vomiting. He gave no history of previous deafness, tinnitus, nasal or ear trouble. He showed no evidence of paralysis nor paresis of any of his facial or other muscles. Neurological examinations of his arms, legs, etc., were entirely negative. The examination of the nose and ears was negative with the exception of some slight congestion of the handle of the malleus of the right ear. Hearing for both bone and air conduction of the right ear was roughly normal. The left ear showed absence of air conduction but presence of some bone conduction, probably borrowed. The Weber reaction was definitely laterialized to the right. There is some spontaneous nystagmus to the right on looking to the right. The nystagmus is rotary in character and accentuated when the patient is in the erect posture.

June 6, 1922. When the patient was seen today the nausea was slightly better but he had distinct rotary nystagmus to the right when looking

forward while in the erect posture. He also showed nystagmus to the right when looking to the right. There is no vertical nystagmus present. Air conduction is still absent.

June 8, 1922. When seen today the vertigo had markedly improved and he had no more vomiting, being able to go to the bathroom without vomiting. Spontaneous rotary nystagmus has disappeared. He has a trace of albumen in his urine and his blood pressure is now 130.

October 8, 1922. The patient was not seen again by the writer until today when he reported at my office for further study. He states that during the acute attack he remained in bed under the care of Dr. Boston for thirteen days and then remained quiet about the house for two weeks longer. Following the acute attack he had some tinnitus like the sounding of a bell at first and later like dropping water but at no time was the tinnitus severe. He has had no vertigo whatever since the acute attack passed off, not even on turning quickly. He has had no headaches nor complaints with vision.

Examination shows the left pupil slightly larger than the right. Examination of the nose shows a deflection high up on the left side with a vomer ridge to the right. The left inferior turbinate is turgescent. There is no discharge in the nose and translumination of the frontal and maxillary sinuses is negative. The tonsils are moderately enlarged and show white granular superficial deposits but there are no cheesy deposits in the crypts. Both ears are practically normal in all details upon external examination.

Hearing tests show Weber test distinctly laterialized to the right or well side. Examination of the right ear shows poritive Rinne with the time of the air and bone conduction normal. Air conduction was normal for C, C1, C2, C3, C4, with increased bone conduction on placing the finger in the right ear but not on placing the finger in the left canal. The Galton whistle was heard throughout the full range.

Examination of the left ear shows absence of air conduction for all forks excepting C4, which is heard but with greatly diminished intensity. He also hears high shrill tones and the shouted voice when close to the concha but cannot distinguish words but merely noise. The Galton whistle was heard throughout its range. Bone conduction with the C1, 128 vibrations, was quite good but decreased. Much of it was probably borrowed as it could be increased by placing the finger in the right ear but the intensity was not affected by placing the finger in the left ear, the ear being tested. The tests for air conduction with the high notes were carried on while douching the right ear.

Neurological examinations were entirely negative for Romberg, station, girdle reactions, adiadokokinesis, etc. There is no spontaneous nystagmus. No turning tests were performed but each ear was douched with water at 56° F.

After douching the left ear for four minutes with the head forward 15° no nystagmus was present. The head was then tilted back about 65° when he developed a rather quick horizontal nystagmus to the left of fair size. He pastpointed slightly to the left with the left hand while in this position.

After douching the right ear for two minutes with the head forward 15° he showed a very fine rotary nystagmus to the right but touch with both hands. When his head was put back he developed a horizontal nystagmus to the right but again touched with the right hand but pastpointed several times in succession about two inches to the right with the left hand.

The case has appeared to the writer of interest because of the youth of the patient and obscurity of the etiology as well as the diagnosis. The case has all the earmarks of a labyrinthian hemorrhage in which there has evidently been considerable destruction of the statica and acoustic labyrinth but not complete, resolution and absorption evidently occurring in small degree. There were certain elements in the examination which cast some little doubt upon the clear cut nature of the diagnosis but this may have been corrected at subsequent examinations of which the writer was unfortunately deprived. He had hoped to see the patient much

sooner than he appeared so that he has not been able to check up the single examination made upon October 8, 1922. As the patient was then feeling a little the worse for wear it was inadvisable to repeat the douching of the right ear to see whether he would again fail to pastpoint with right hand while doing so with the left hand. Investigation further as to why he showed no evidence of nystagmus until after douching the right ear two minutes and then only a very fine reaction with no pastpointing with either hand while in the erect posture. A Wassermann reaction has been recommended to Dr. Boston, who said that he would see that it is made.

Despite the above deficiencies the writer feels that the case is one of labyrinthian hemorrhage and unusual for one at his age in his occupation. It is more common in caisson workers and others who work under forced air pressure. The only thing in his history which may have a causitive bearing is the fact that for some unknown reason the patient had a high blood pressure and then went in swimming. He did not swim under water nor dive deeply but merely from the side of the pool into shallow water.

Case of Pemphigus Beginning in the Mouth.

M. P., age 51 years, gives a history of having had a severe cough with some hemopthysis about six months ago from which he apparently recovered. About three months ago he began to get hoarse and developed a sore throat but it apparently improved again until within the last couple of weeks when his throat again swelled up and he has been unable to eat. He has night sweats and has lost twenty-four pounds.

Examination of the nose shows a papillary mass beneath the right inferior turbinate and a polyp beneath the left middle turbinate. Examination of the mouth shows the entire hard and soft palate, gums and all visible parts of the mouth, covered with a silvery sheen geographically delineated from intensely congested bleeding streaks and areas. These extended over the lips, which were covered with bleeding crusts. It was impossible to see the larynx because of the intense soreness of the mouth and tongue.

The appearance was not that of a local infection but the condition looked like some part of a general dyscrasia, such as syphilis, scurvy, tuberculosis, etc. The Wassermann proved to be negative but the Hecht-Gradwohl reaction was positive, so the patient was sent to Dr. Louis Jacob for the injection of salvarsan, both as a provocative and for diagnostic purposes.

After being given three injections of salvarsan on alternate days, the patient showed no improvement but became quite toxic and was sent by Dr. Jacob into the Polyclinic Hospital in the medical service. When admitted there he was suspected of having diphtheria and given antitoxin, but cultures and stain for diphtheria and Vincent's angina were both negative. He developed an antitoxin rash, which persisted for a few days and then disappeared. His condition did not improve very much, as he was still unable to eat and lost five pounds more. While still in doubt as to the real diagnosis the patient suddenly, on the 24th of June, developed a generalized outbreak of bullae and vesicles over his entire body. The vesicles appeared upon a healthy base and ruptured readily, typical of pemphigus.

After the appearance of the skin rash he apparently improved, the lesions almost completely disappearing, his eating improved and the patient gained in weight. He returned home only to have the lesions return. He has been getting progressively worse until he became so weak that he was readmitted to the Polyclinic Hospital on October 8, 1922, where he will probably die in a very short time.

The case is of unusual interest because of the late age at which the disease developed and the fact that it remained localized to the mouth for a period of almost three months before appearing upon the skin. The nature of the mucous membrane of the mouth changed the entire appearance of the lesions which closely resembled ulcerated mucous patches.